MONITORING VISITOR DISTRIBUTION AND USE PATTERNS ALONG THE COLORADO RIVER CORRIDOR

RIVER CONTACT SURVEY & ATTRACTION SITE MONITORING

Status Report January, 1990

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Acknowledgements

Thanks goes out to several individuals who worked on and supported this monitoring project. To the folks in the River Sub-district for the transportation to attraction sites, and especially to Tom and Lenore at Lee's Ferry who distributed yet another piece of paperwork to the guides, and tolerated the questions regarding the survey; and to Susan for the statistics and expertise. To Katy and Marty, seasonal resource specialists for long hours and weeks in the grand old Canyon at these sites. To the professionals who reviewed the study plan and provided constructive criticism namely, Thomas A. Heberlein, Bo Shelby, David Cole, Larry Stevens, and Richard Fernandez. To my co-workers in the Division who withstood the disruptions while processing statistics, and especially those who helped edit this report. To the Grand Canyon Guides for their participation in the survey and who provided support and friendship during the hot hours spent in paradise; and to the outfitters, who contributed to the program by encouraging the guides to participate, and for helping the monitoring teams get downriver to the observation sites.

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ABSTRACT

Two monitoring programs were conducted to assess the success of the management objectives outlined in the Colorado River Management Plan (CRMP). The River Contact Survey and Attraction Site Monitoring programs took place during the Shoulder Use Period (May 1 - 30) and High Density Period (June 1 - August 15) in the 1989 Primary Season.

The findings of the River Contact Survey indicate that the management objectives were met in terms of the **average** number of contacts made for all trips sampled. The **average** number of contacts was calculated by dividing total contacts made during a given trip by the trip length. The highest number of **actual** on-river contacts were made in the attraction site "set up corridors", those areas of the river corridor where river parties camp before or after visitation at a destination site.

Although we were successful in gaining 80% response from the general public, we were unsuccessful at getting the same rate from the commercial outfitters. It may be necessary to modify the River Contact study plan to include a more promising means of obtaining an adequate sample size in order to meet the OMB 80% response requirement. Further development of a cooperative arrangement with the Grand Canyon Guides Association will improve the chances of gaining the necessary response rate. This will also involve a specific selection of trips to be sampled with follow-up done on an individual basis.

The findings of the Attraction Site Monitoring program confirms a previous suggestion that trips of similar lengths and type launching on the same day tend to visit attraction sites at the same time. This contributes to crowding and congestion at these sites.

During the shoulder season, the objective contact levels at attraction sites were met for 63% of the trips sampled. During the high density season, objective contact levels at attraction sites were met for 86% of the trips sampled. This indicates that management objectives are being met most of the time. Continuation of the Attraction Site monitoring program will be necessary to support baseline information.

Introduction

The revised Colorado River Management Plan (CRMP) has included Management Objectives that address the quality of the visitor experience. The plan establishes long-term integrated monitoring programs to assess the experiential environment as well as changes in natural and cultural resources. The river contact and crowding monitoring programs look at the actual use levels at destination sites during each use period as well as contacts with other parties while travelling on the river. Previous sociological studies done at Grand Canyon indicate that density (frequency and number) of trips affects the character of the experience (Shelby, et al, 1976).

The purpose of the monitoring program is to identify the current trends and conditions of present use levels and to determine if these use levels are within the limits identified in the CRMP management objectives. The monitoring program focused on two different projects and methods. The river contact data was obtained through the use of a survey form, and the attraction site data was obtained by conducting onsite observations at specified destination sites.

Background

In 1976, a four part River Contact Study was completed and included in the Grand Canyon Colorado River Research Program. Prior to this, the effects of use levels on the cultural and natural resources or the river experience had not been assessed. The findings of the River Contact Study revealed that different use levels have an effect on the character of the Grand Canyon experience in terms of river and attraction site contacts (Shelby and Nielsen, 1976).

Since the 1976 study, subsequent research and monitoring programs have been conducted including the 1980 River Patrol monitoring program (Shelby and Harris) and the GCES flow related recreational studies (HBRS, et.al., 1985). The purpose of these monitoring programs has varied, yet the results have consistently shown that a correlation exists between launch dates and contacts. These findings support conjectures by Colorado River users. It is hoped that the current monitoring program will document changes and provide the information needed to insure that management objectives are being accomplished.

The objectives of the river and attraction site monitoring program are: 1) to collect data on river contacts by the use of a survey form distributed to commercial guides and private trip leaders; 2) to conduct onsite observations at selected

attraction sites during each use period; 3) to measure the results of the findings of the river contact survey and attraction site observations against the contact levels identified in the CRMP management objectives, and, 4) to apply the results to the current management strategy and make recommendations to mitigate impacts of congestion along the river corridor.

The monitoring program also attempted to examine the implications of the "double launches" on the crowding and congestion issue. During the 1988 and 1989 summer seasons, an additional 30 and 38 noncommercial launches were scheduled respectively. Prior to this, only one noncommercial launch was scheduled each day during the summer season. This change in scheduling is intended to enhance the opportunity for the noncommercial sector to fill it's allocation. It was speculated that the increase in the number of launches would contribute to downstream congestion and crowding at attraction sites.

The current monitoring program is designed to obtain data that will permit evaluation of the management objectives delineated in the 1988 CRMP. These management objectives were based upon the wilderness management concept of "limits of acceptable change" (LAC) described by Stankey et al in 1987. The LAC system of management provides a framework for identifying problems and management responses to problems. This involves the development of specific, quantifiable goals for management and measures needed to attain these goals. The management objectives that deal specifically with the visitor experience are described in the following table.

Table 1: Management Objectives and Means of Assuring Attainment: Temporal Recreational Opportunity Spectrum

Use Period	Management Objective	Means of Attainment
Primary Season- High Density Use Period: 6/1 - 8/15	a) Launch limits: 166 people/day, 1000/ week. b) 80% probability that a party will contact up to 7 parties/day on river. c) 80% probability of contacts at 70% of attraction sites; w/ 100% probability of contacting 150 at LCR, Elves, Deer and Havasu.	a) Establish weekly trip launch limits. b) Equalize distribution of trip launches throughout week. c. Voluntary compliance with 'no layover' stipulations and suggested attraction site stop durations. d. Reduction of number of trips per week allowed.
Primary Season - Shoulder Seasons: 5/1 - 6/1 and 8/15 -9/30	a) Launch limits: 166 people/day, 700/week. b) 80% probability that a party will contact up to 4 parties/day on river. c) 80% probability of contacts at less than 50% of sites; w/ 65% probability of 70 people at LCR, Elves, and Deer; and 90% probability of 50-100 at Havasu.	
Secondary Season - Low Density Use Period: 10/1 - 4/30	a) Launch limits: 12 trips/week; 2 trips/day; 332 people/week. b) 80% probability of less than 2 contacts/day. c) 80% probability of contacts at 20% or less at attraction sites. Probabilities for LCR, Elves, Deer and Havasu remain as high as 60%, but with density less than 40 people.	

This report contains various graphs and tables to illustrate data. A number of abbreviations and terms are used, not clearly defined in the body of the report. The following list provides this information.

1. Use Periods
   PRISH - Primary Season, Shoulder Season: 5/1 - 5/30, and 8/15 - 9/30
   PRIHD - Primary Season, High Density Period: 6/1 - 8/15
   SECDY - Secondary Season, Low Density Period: 10/1 - 4/30

2. Locations
   LFY - Lee's Ferry, Mile 0 (Put-in)
   LCR - Little Colorado River, Mile 61.5 (Attraction Site)
   PHA - Phantom Ranch, Mile 88 (Access/Egress)
   ELVES - Elves Chasm, Mile 116.5 (Attraction Site)
   DEER - Deer Creek, Mile 136.3 (Attraction Site)
   HAV - Havasu Creek, Mile 156.7 (Attraction Site)
   LAV - Lava Helipad, Mile 182.5 (Egress)
   WHI - Whitmore Helipad, Mile 187.4 (Egress/Access)
   DIA - Diamond Creek, Mile 225.8 (Take-out)
   PFY - Pearce Ferry, ~Mile 280 (Take-out)

3. River Outfitters
   ADVW - Adventures West, Inc. (Motor)
   AZRA - Arizona Raft Adventures, Inc. (Oar, Motor)
   ARIZ - Arizona River Runners (Motor)
   CAEX - Canyon Explorations, Inc. (Oar)
   CANY - Canyoneers, Inc. (Motor)
   COLO - Colorado River & Trail Expeditions (Motor, Oar)
   DIAM - Diamond River Adventures (Motor, Oar)
   EXPD - Expeditions, Inc. (Oar)
   GEOR - Georgie's Royal River Rats (Motor)
   GRCD - Grand Canyon Dories (Oar)
   GRCE - Grand Canyon Expeditions (Motor)
   HATC - Hatch River Expeditions, Inc. (Motor)
   SLEI - Mark Sleight Expeditions, Inc. (Motor, Oar)
   MOKI - Moki Mac River Expeditions, Inc. (Motor, Oar)
   OARS - OARS, Inc. (Oar)
   OUTD - Outdoors Unlimited (Oar)
   WHIT - Sobek White Water Expeditions (Motor)
   TOUR - Tour West, Inc. (Motor, Oar)
   WEST - Western River Expeditions, Inc. (Motor)
   WRAD - Wilderness River Adventures (Motor, Oar)
   Private - Any Noncommercial river trip

4. Miscellaneous
   CM - Commercial Motor
   CO - Commercial Oar
   PM - Private Motor
   PO - Private Oar
   PC - Private Combined (Motor and Oar)

River Contact Survey

Data Collection Methods

A survey form was developed to collect information on the number of contacts a river party makes while travelling on the river and at campsites. The content of the survey was based on the methodology of the 1976 River Contact Study (Shelby and Nielsen) and the 1980 River Patrol monitoring (Shelby and Harris). The form was designed to obtain accurate information with minimal effort by participants (See Appendix A).

In order to make a comparison to the baseline studies (Shelby and Nielsen, 1975), a minimum 8% sample size was needed although a 10% sample size was targeted. The sampling was a combination of nonrandom and random selection within use strata. This provided a proportionate representation of motor/oar and commercial/noncommercial trips (Figure 1).

The survey form was distributed to noncommercial users on a random basis. Using a random numbers table, noncommercial launch dates were selected. During the mandatory orientation and trip check-out procedure, the permittee was given a survey form with a stamped, addressed envelope by the Lee's Ferry Ranger. The surveys were distributed to commercial river guides, one form per trip on both a random and nonrandom basis. The Lee's Ferry rangers distributed the forms on selected days of the week. Survey forms were also sent to the outfitters with a request to encourage the participation of their guides.

An effort was made to coordinate distribution and participation through the Grand Canyon Guides Association. Although a committee of interested guides was formed to address the crowding issue in the Canyon, it was difficult to meet with them and discuss the survey in detail. As a result, communication with committee members was scattered and little coordination existed. Some guides made specific requests to participate in the monitoring program and were sent forms. Survey forms were returned by mail and to the rangers at the launch ramp. A list of the trips sampled is included in the appendix of this report.

Certain assumptions were made given the limitations of survey methods. Although a genuine interest was expressed by the guides prior to the initiation of the river contact survey, actual participation was a disappointment. The survey design was modified to simplify the daily recording of information without loosing it's significance. In the original studies, trained observers were employed to provide accurate information. It was assumed that similar data could be obtained through the modified form. Recognizing the extent of

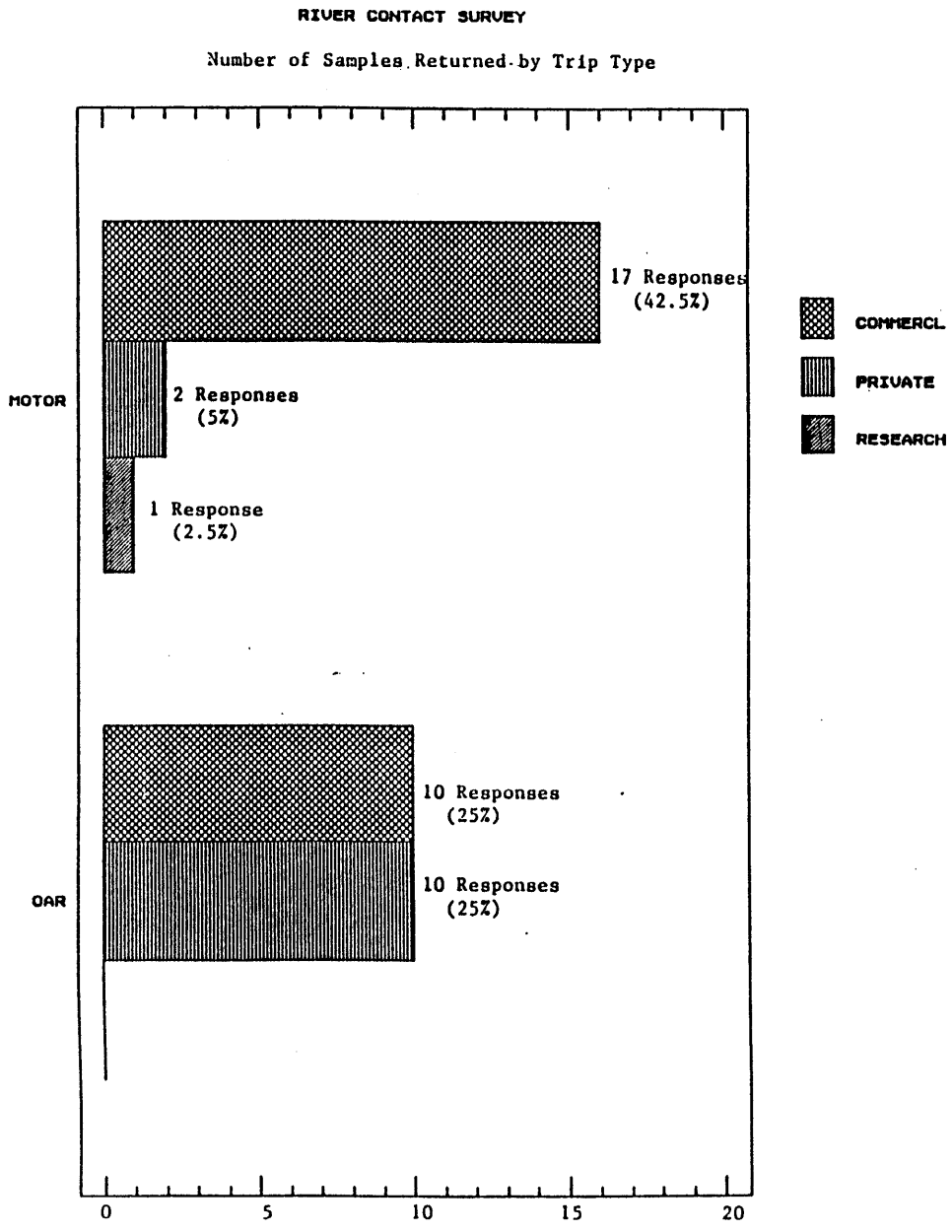


Figure 1

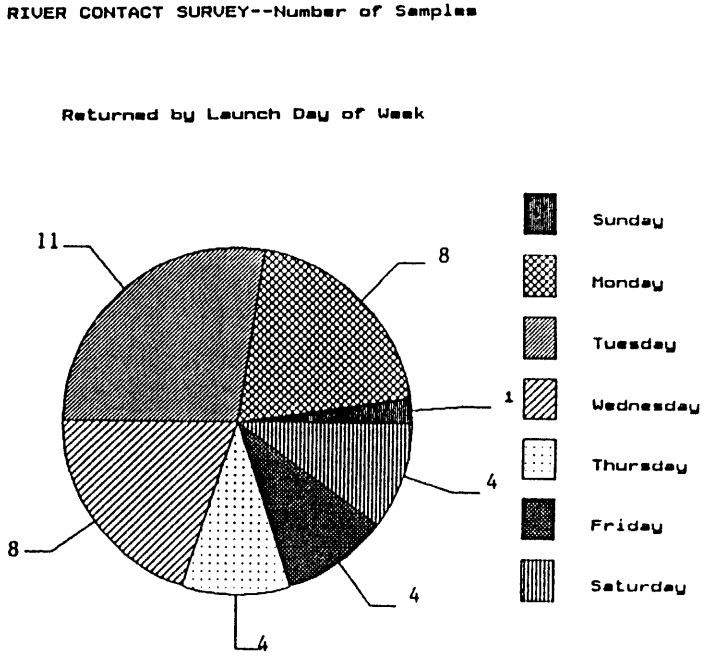


Figure 2

a guide's daily routine, it was often difficult to accurately record the actual number of people their trip contacted on a daily basis. As a result, adjustments in data analysis were made due to obvious errors in recording.

Analysis of Data

From the completed survey forms, calculations were performed to determine the following:

1) Total number of trips contacted per day
2) Average number of trips contacted per day
3) Number of contacts by day of trip (i.e. when and where contacts were being made during a trip)
4) Total number of people contacted per day
5) Average number of people contacted per day
6) Type of trips contacted per day (i.e. commercial oar, commercial motor, and private.)

The actual numbers were compared to the limits defined in the CRMP management objectives. The average number of trips and people contacted are used in this report. Because of the length of the database, the actual numbers of contacts are not entirely illustrated in this report, however, the findings and recommendations are based on this information.

Findings and Perspectives

Approximately 200 surveys were distributed to river guides and noncommercial trip leaders. Of those, 50 forms were completed and returned but only 40 provided accurate information. (Figure 2.) This was approximately a 5% sample; three percent short of the minimum size needed to measure against the 1975 baseline studies. The data however, provides some useful information.
The information resulting from data collected by the 1989 River Contact Survey supports the previous notion that a relationship exists between launch day and downstream congestion. It is known that scheduling trips of similar types and lengths on certain days of the week may also contribute to downstream congestion and increased river contacts.

Typically, the heavier launch days are Saturday, Sunday, Monday and Tuesday. During these days, up to 150 commercial passengers and 16 noncommercial river users launch from Lee's Ferry.

The following tables list the average contacts made overall, by day of week, and by trip type.

Table 2: RIVER CONTACT SURVEY - Average Contacts[1]

All trips all seasons sampled.

Type of Trip	# Samples	Average # Trips Contacted	Average # People Contacted	Average Trip Length	Average Trip Size
Commercial Motor	16	4.8	81.4	7 days	26
Commercial Oar	10	4.2	48.5	12 days	22
Private Motor	2	3.4	46.6	12 days	14
Private Oar	11	3.4	46.2	16 days	12

Table 3: RIVER CONTACT SURVEY - Average Contacts by Day of Week[2]

Day of Week	# Samples	Average # Trips Contacted	Average # People Contacted
Sunday	1	4.0	98.0
Monday	8	3.5	59.0*
Tuesday	11	4.1	67.5**
Wednesday	8	4.2	49.6*
Thursday	4	5.0	73.7
Friday	4	4.6	73.5
Saturday	4	4.8	86.3

* Two Samples were not averaged in due to incomplete data.
** One Sample not averaged in due to incomplete data.

Table 4a: RIVER CONTACT SURVEY - Average Contacts by Trip Type*

Day of Week	Commercial Motor	Commercial Oar	Private Motor	Private Oar
Sunday	0.0 (0)**	0.0 (0)	0.0 (0)	4.0 (1)
Monday	3.3 (2)	3.8 (5)	0.0 (0)	2.4 (1)
Tuesday	4.2 (6)	4.8 (3)	4.4 (1)	3.0 (1)
Wednesday	5.0 (4)	3.6 (1)	2.3 (1)	2.9 (2)
Thursday	7.0 (1)	0.0 (0)	0.0 (0)	4.4 (3)
Friday	6.4 (1)	0.0 (0)	0.0 (0)	3.6 (2)
Saturday	6.0 (2)	5.0 (1)	0.0 (0)	2.1 (1)

* All Trips sampled, all seasons
(0)** Number of Samples

[1] Average contacts is determined by total number of contacts for the trips divided by the trip length. It is the average number of contacts per day for the trip.

[2] Day of week refers to the day a trip launched.

Table 4b: RIVER CONTACT SURVEY - Average Contacts by Trip Type*

Day of Week	Commercial Motor	Commercial Oar	Private Motor	Private Oar
Sunday	0.0 (0)	0.0 (0)	0.0 (0)	4.0 (1)
Monday	3.3 (2)	3.9 (4)	0.0 (0)	2.4 (1)
Tuesday	3.6 (5)	6.0 (2)	0.0 (0)	3.0 (1)
Wednesday	5.0 (4)	3.6 (1)	2.3 (1)	3.7 (1)
Thursday	7.0 (1)	0.0 (0)	0.0 (0)	5.0 (2)
Friday	6.4 (1)	0.0 (0)	0.0 (0)	0.0 (0)
Saturday	6.0 (2)	5.0 (1)	0.0 (0)	0.0 (0)

* Primary Season-High Density Use Period: June 1 - August 15, 1989

Although the sample size is such that the results are not significant, the above data suggests that commercial motor and oar trips generally make more contacts than private trips. It should be noted that data for a commercial Sunday launch is unknown. The highest number of contacts also seems to be occurring on motor trips that are launching on Wednesday, Thursday, Friday and Saturday. Although fewer trips actually launch on these days, more contacts are made downstream. The data also suggests that the commercial motor and oar trips are making the greatest number of contacts on the fifth or sixth day of the trip: usually when the trip is at or near Deer Creek and Havasu. This is also supported by the data obtained through the Attraction Site monitoring program.

A total of 436 days were sampled by all river users. During the shoulder season, on 20 of 75 days sampled, the number of contacts exceeded 4 parties for six different trips. The management objectives for this use period delineate four contacts in one day as the maximum before management response is triggered. During the high density season, on 43 of 361 days sampled, the number of on-river contacts exceeded the defined limits (up to 7 parties) for 21 different trips. In other words, over half of the 40 trips sampled during primary season experienced contact levels that exceeded the limits identified in the CRMP.

The data however, shows that the <u>average</u> contacts for all trips was under the defined limits in the CRMP. (Figure 3.) This demonstrates the range in number of contacts a trip makes day by day. The surveys also revealed that many of the contacts are made at attraction sites or in the attraction site "set-up" corridors.

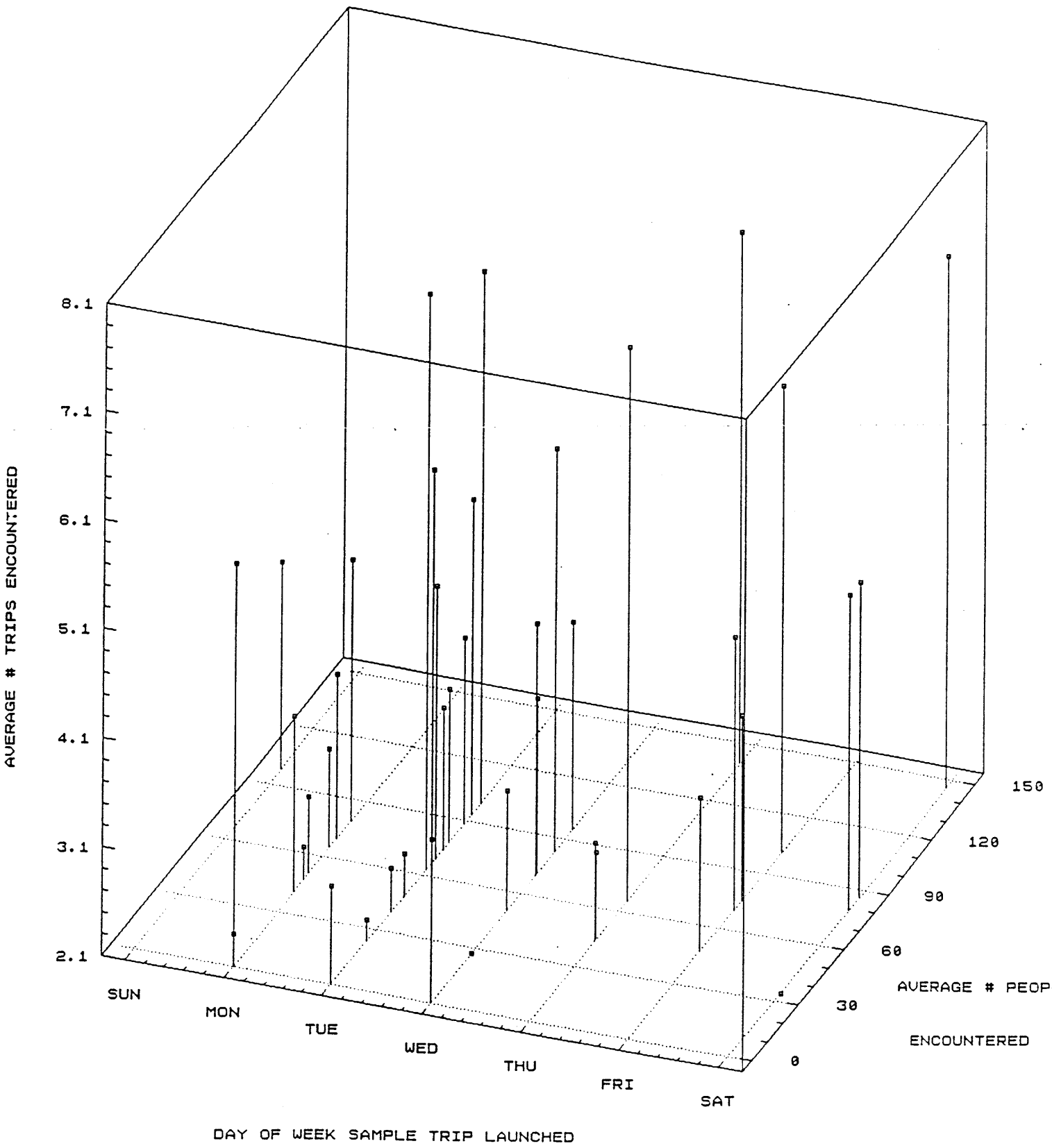

RIVER CONTACT SURVEY
AVERAGE # OF TRIPS AND PEOPLE ENCOUNTERED BY WEEKDAY
AVERAGE # TRIPS ENCOUNTERED
8.1
7.1
6.1
5.1
4.1
3.1
2.1
SUN
MON
TUE
WED
THU
FRI
SAT
DAY OF WEEK SAMPLE TRIP LAUNCHED
0
30
60
90
120
150
AVERAGE # PEOPLE ENCOUNTERED

Figure 3

Summary and Conclusions

It seems that in order to more clearly define and correlate river contacts with experience, a more specific sampling method needs to be done. Commercial motor trips make up about 70% of the total number of trips but do not represent 70% of the total sample. The sample of commercial oar trips was an adequate size, but not all weekdays were sampled. The most representative sample was produced by the private sector. This is clearly a result of random selection and follow-up letters. We are required to achieve an 80% return rate from all user groups. Since this response rate was achieved for the private sector only, it is apparent that we need to resolve this problem. We would like to involve guides and outfitters in the solution, otherwise it may be necessary to abandon this part of the monitoring program and seek another means of obtaining the river contact information as mandated by the CRMP.

Although the sample size was small, the data suggests the following in terms of the management objectives:

Shoulder Season: On 73% of the sampled days groups had contacts with less than 4 parties. Of the 7 trips responding, 6 experienced levels that exceeded the limits; this occurred 20 of the 75 days sampled. The Colorado River Management Plan states that this season will "be managed for medium density", and during this period, high density levels were often experienced.

High Density Season: On 88% of sampled days, groups had contacts with less than 7 parties. Of the 33 trips responding, 21 experienced levels that exceeded the limits; this occurred 43 of the 361 days sampled.

Attraction Site Monitoring

Data Collection Methods

The attraction site observations were made by NPS personnel. Observers were originally scheduled to be at each attraction site (Little Colorado River, Elves Chasm, Deer Creek and Havasu) for a period of up to seven days during each use period (Figure 4). Adjustments were made due to availability and scheduling difficulties.

Table 5: ATTRACTION SITE SURVEY - Total Observations

Site	Dates	Days	Total number of trips	Total number of people
LCR*	May 25 - 29	Thu - Mon	19	408
LCR	June 3 - 6	Sat - Tue	21	389
LCR	June 26 - 30	Mon - Fri	37	813
Elves	July 23 - 27	Sun - Thu	16	384
Deer Creek*	May 10 - 16	Wed - Tue	23	432
Deer Creek	June 18 - 24	Sun - Sat	39	870
Havasu*	May 18 - 22	Thu - Mon	29	497
Havasu	July 22- 28	Sat - Fri	38	908

* Observations during Shoulder Season

An observation data sheet was developed based on the previous studies (See Appendix B). The data collected by park personnel provides accurate information on use at the destination sites. The sample observation periods were designed to be representative of typical use patterns. A total of 45 observation days were spent during the primary use period.

The limitations of the methodology used in the Attraction Site survey were fewer than those of river contact survey. In order to obtain the most accurate data, the observer was required to be at a place to observe the actual arrival and departure of the trips. Although the various activities were recorded at each site, the number of specific contacts were not always recorded, but certain assumptions were made based on the nature of the activity, time of arrival and time of departure. The time of arrival was the time the trip actually moored their boats. The time of departure was when the boats left the mooring area. The activities while at the attraction site included hikes of different lengths from 100 yards to five miles from the mooring site.

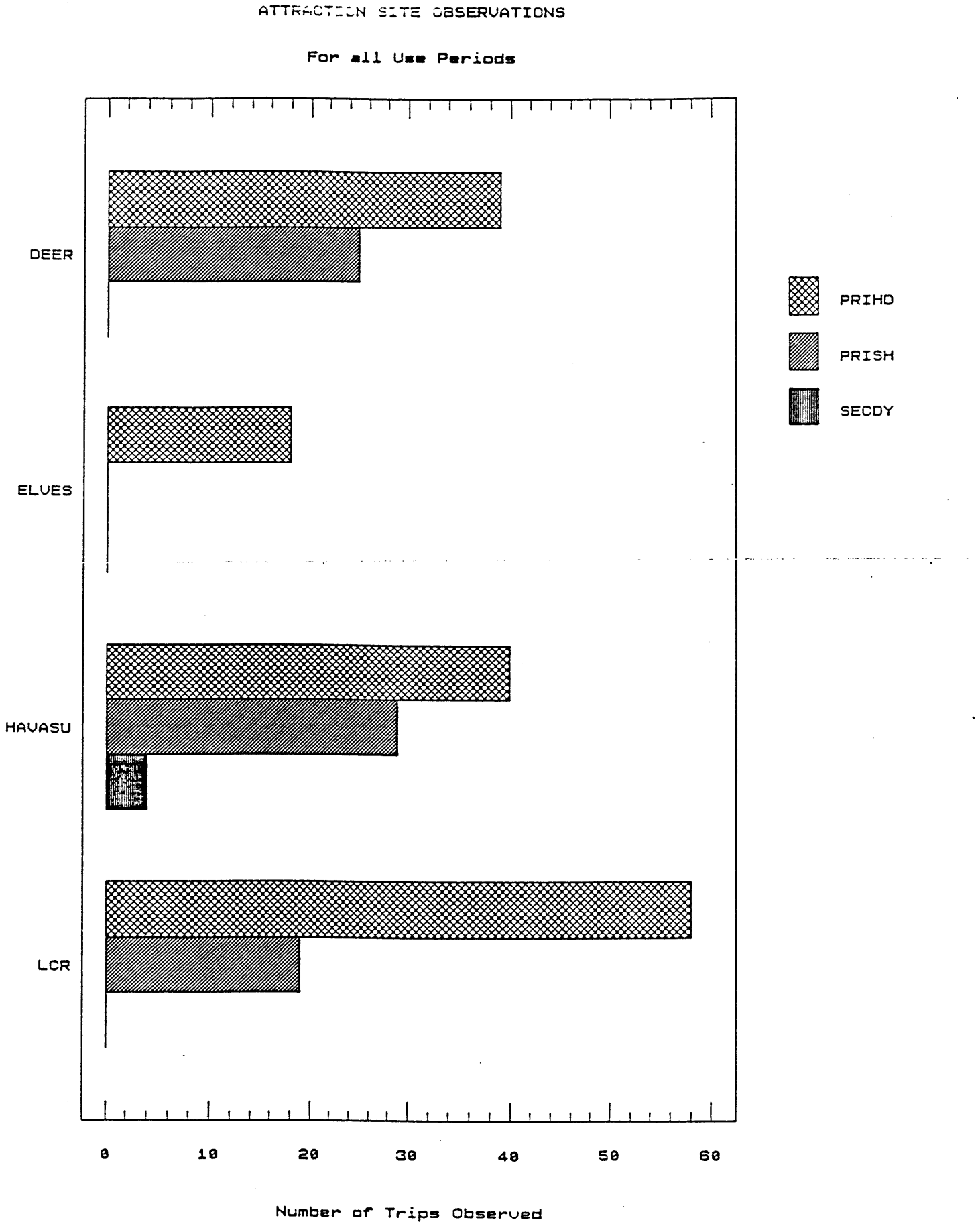

ATTRACTION SITE OBSERVATIONS
For all Use Periods
DEER
ELVES
HAVASU
LCR
PRIHD
PRISH
SECDY
0
10
20
30
40
50
60
Number of Trips Observed

Figure 4

Analysis of Data

The following units of measure were developed to illustrate the findings of the Attraction Site Monitoring program:

1) Number of persons on trip (passengers and crew)
2) Number and type of boats
3) Time spent at site (arrival, departure, duration)
4) Number of contacts made at site (total number people during visit)
5) Launch date, Length of trip and Day arrived at site
6) Activity at site (i.e. hike to Mooney, swim, etc)

This information was used to develop graphs and tables that illustrate the use patterns on the river, specifically at observed attraction sites. The actual values calculated from the monitoring data are measured against the limits defined in the CRMP management objectives. The findings and recommendations of this report are based on this information.

Certain assumptions were made for calculating the number of people contacted at the attraction site. A trip arriving or departing at the time of another group's arrival or departure was recorded as a contact. All people at the attraction site upon the arrival of a given group, were counted as a prospective contact regardless of whether an actual contact was made. In this case however, recording the activity of each group substantiated the contact information for a given group. Commercial boatmen and research crews are also included in the contact levels.

Findings and Perspectives

The information collected during the attraction site monitoring period supports previous suggestions on the relationship between launch days and downstream congestion. River concessioners, guides and NPS have known for sometime that scheduling trips of similar types on specific days of the week contributes to downstream congestion at attraction sites. Certain sections of the river corridor have been identified as high contact areas.

During the high density season, contact levels at certain attraction sites have been exceeded. These conditions are unacceptable given the contact parameters identified in the CRMP Management Objectives. Observations and findings at each site are described below.

1. Little Colorado River (LCR)

The Little Colorado River is the first major tributary that enters the Grand Canyon at river mile 61.5. The blue springs upstream combined with the calcium carbonate deposits, make the warm, azure waters of the LCR a main attraction to all who visit the Canyon by river. During the observation periods, only one motor boat was observed passing the LCR without stopping. It was later learned that a passenger was injured and the trip leader was heading to Phantom to find help. On the other hand, during the rainy season when the LCR is flooding, very few trips stop at the site except to visit the prehistoric and historic sites near Beamer's Cabin.

Three different observation periods were scheduled at the LCR during the high density and shoulder periods. Personnel problems prevented scheduling seven consecutive days at the site however, all days of the week were observed during the two sampling periods in the high density season. The sampling periods combined represent typical use patterns during the high density season.

The data collected at the LCR revealed a fairly consistent use pattern, particularly for commercial motor trips. Generally, commercial motor trips arrive at the LCR on the second day of the trip, the longer motor trips (8+ days) arrive on the third day. There is also a pattern in the number and type of launches during the high density period. For example, GRCE (8 day) and AZRA motor (8 day) usually launch on Saturdays; CANY (6 day), WHIT (7 day) and HATC (7 day) consistently launch on Sundays. During the sample periods at the LCR, these trips visited the site on the same day. On Monday June 26, a total of 9 commercial motor trips visited LCR: 5 of 9 launched on the previous day 6/25, and 4 of 9 launched two days prior, 6/24 (see Table 6a).

A total of 232 people were recorded that day. The number of people contacted by others at the site exceeded the parameters described in the CRMP management objectives. Three trips that visited the LCR on June 26 contacted 203 people (from other trips), five trips contacted 167 people. This particular day seemed to be an exception.

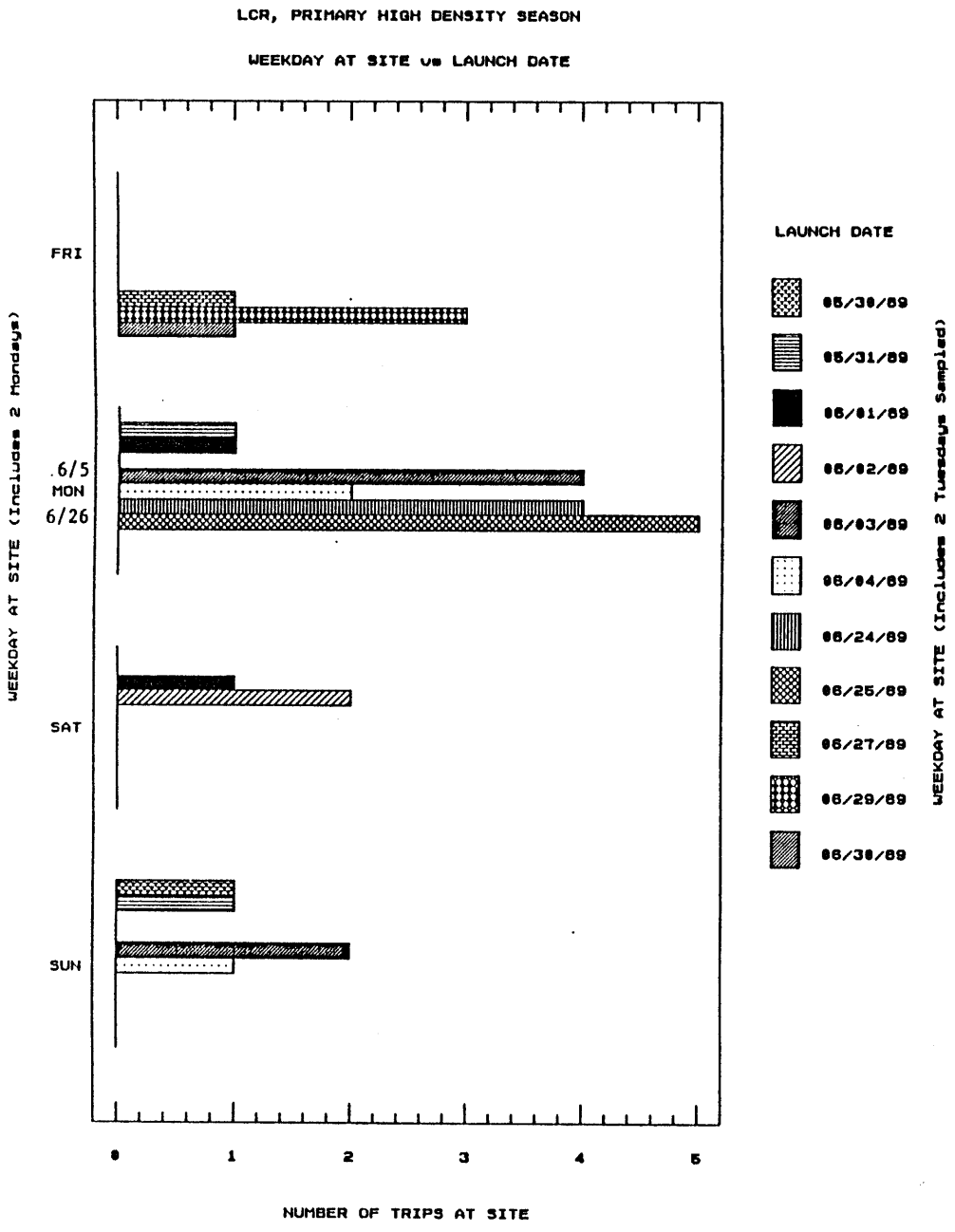


Figure 5a

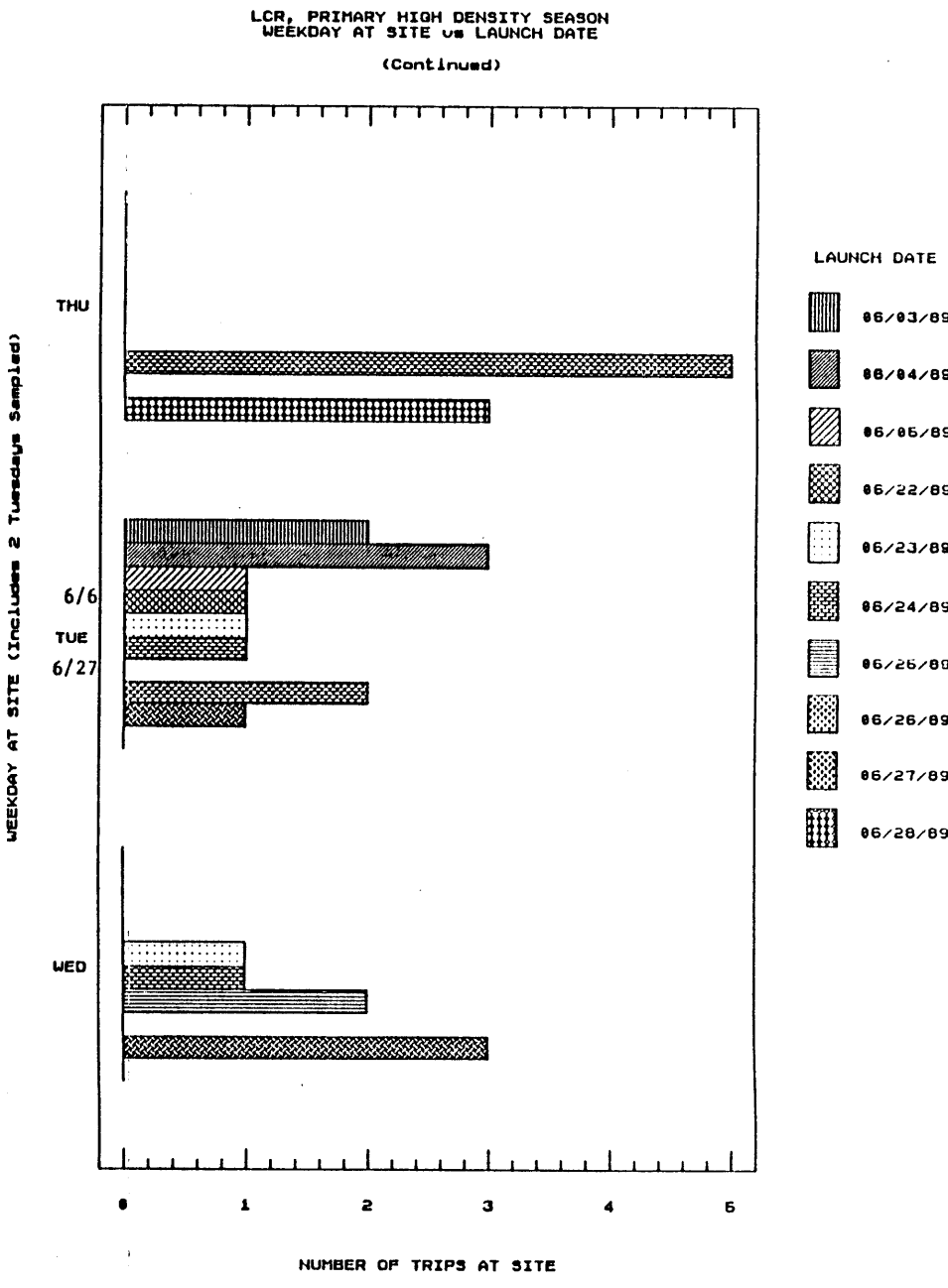


Figure 5a (continued)

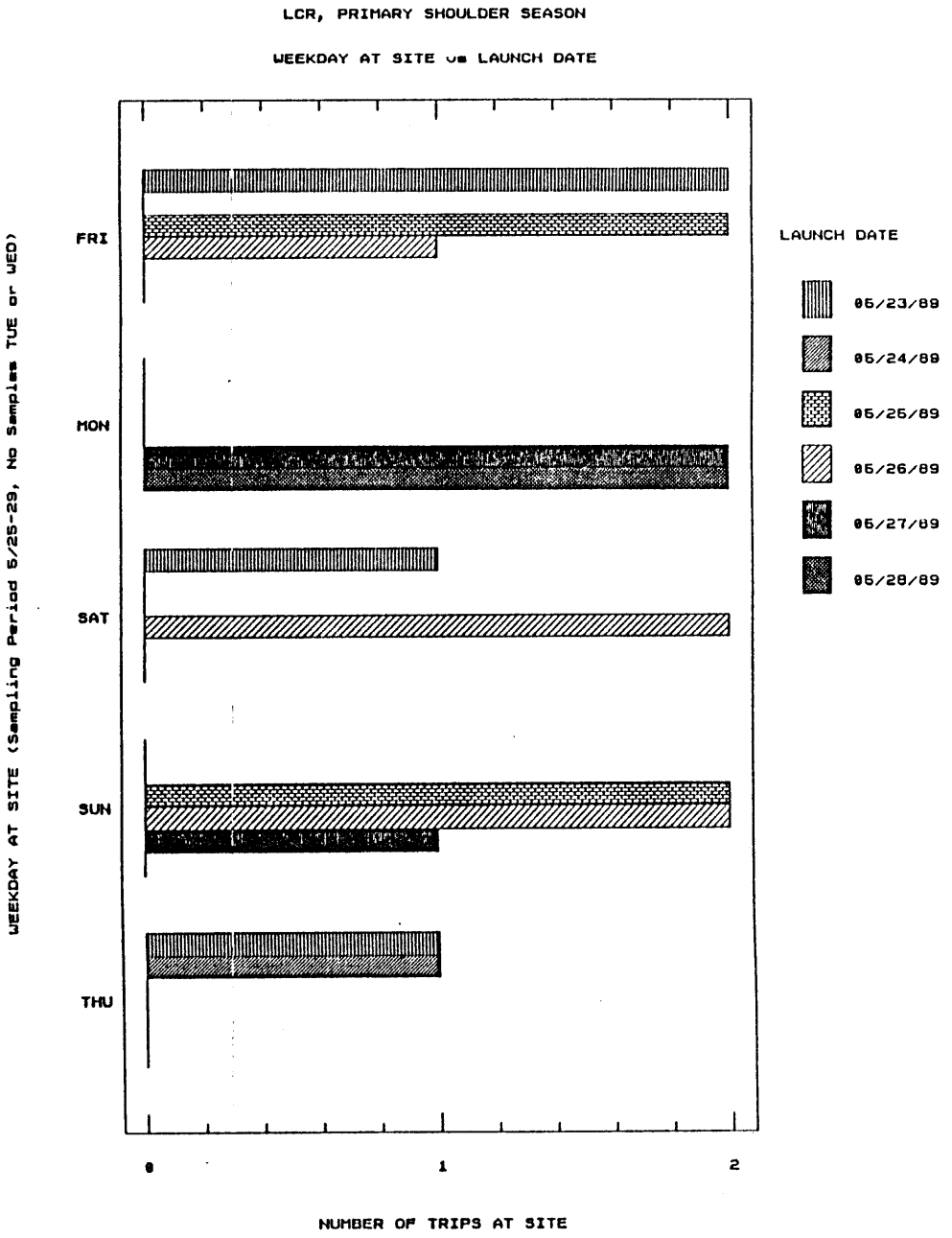

LCR, PRIMARY SHOULDER SEASON
WEEKDAY AT SITE vs LAUNCH DATE
WEEKDAY AT SITE (Sampling Period 5/25-29, No Samples TUE or WED)
FRI
MON
SAT
SUN
THU
0
1
2
NUMBER OF TRIPS AT SITE
LAUNCH DATE
05/23/89
05/24/89
05/25/89
05/26/89
05/27/89
05/28/89

Figure 5b

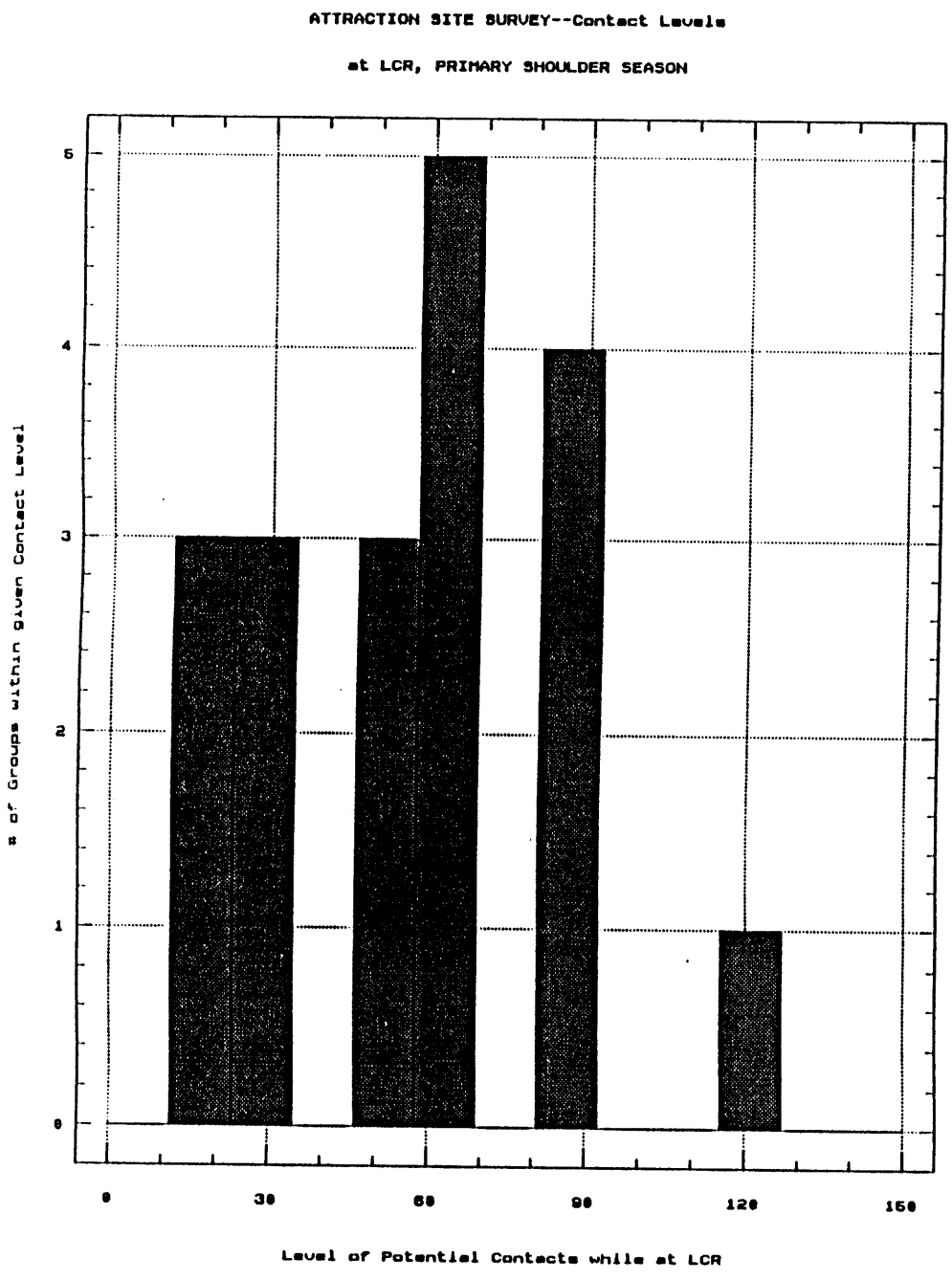


Figure 6a

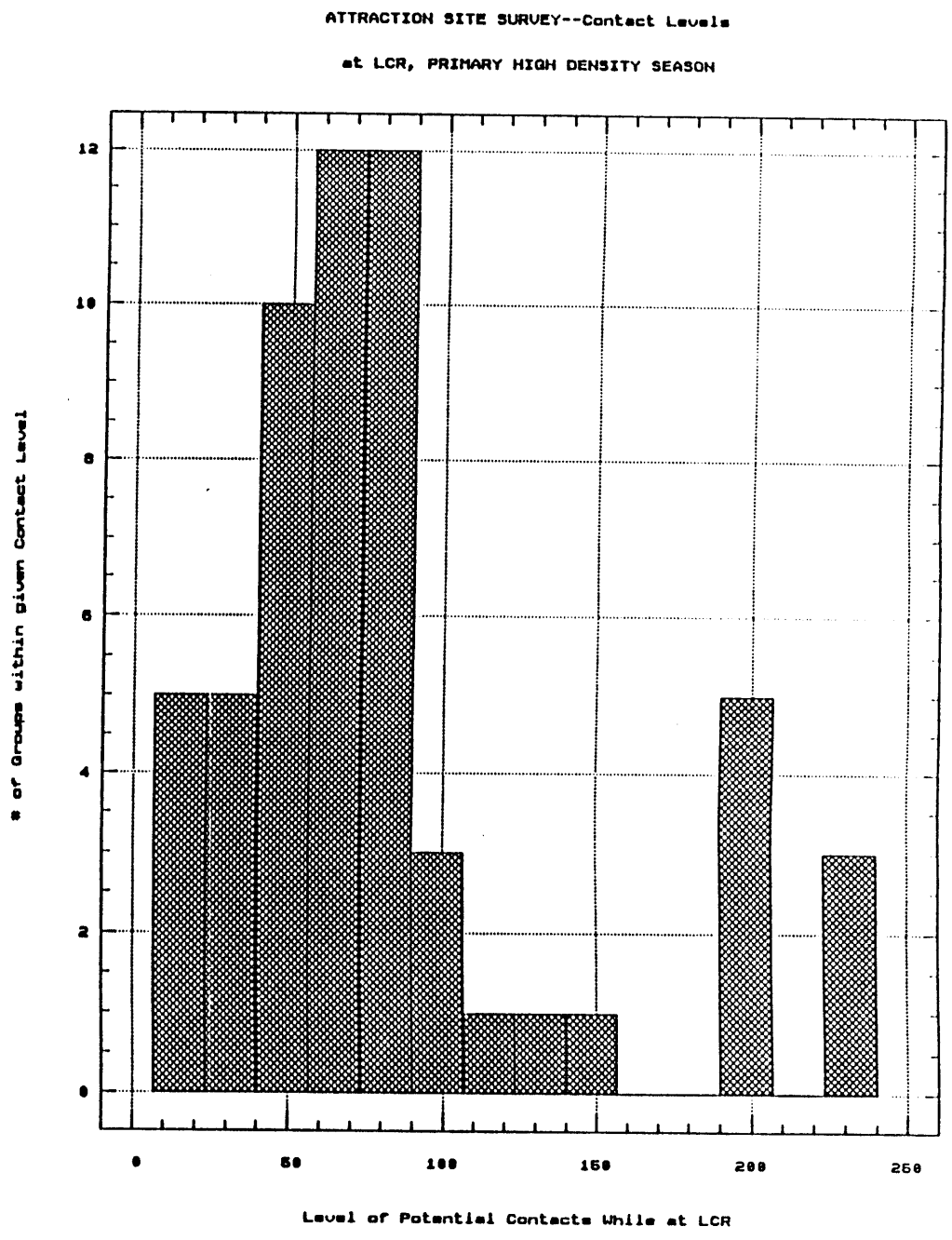


Figure 6b

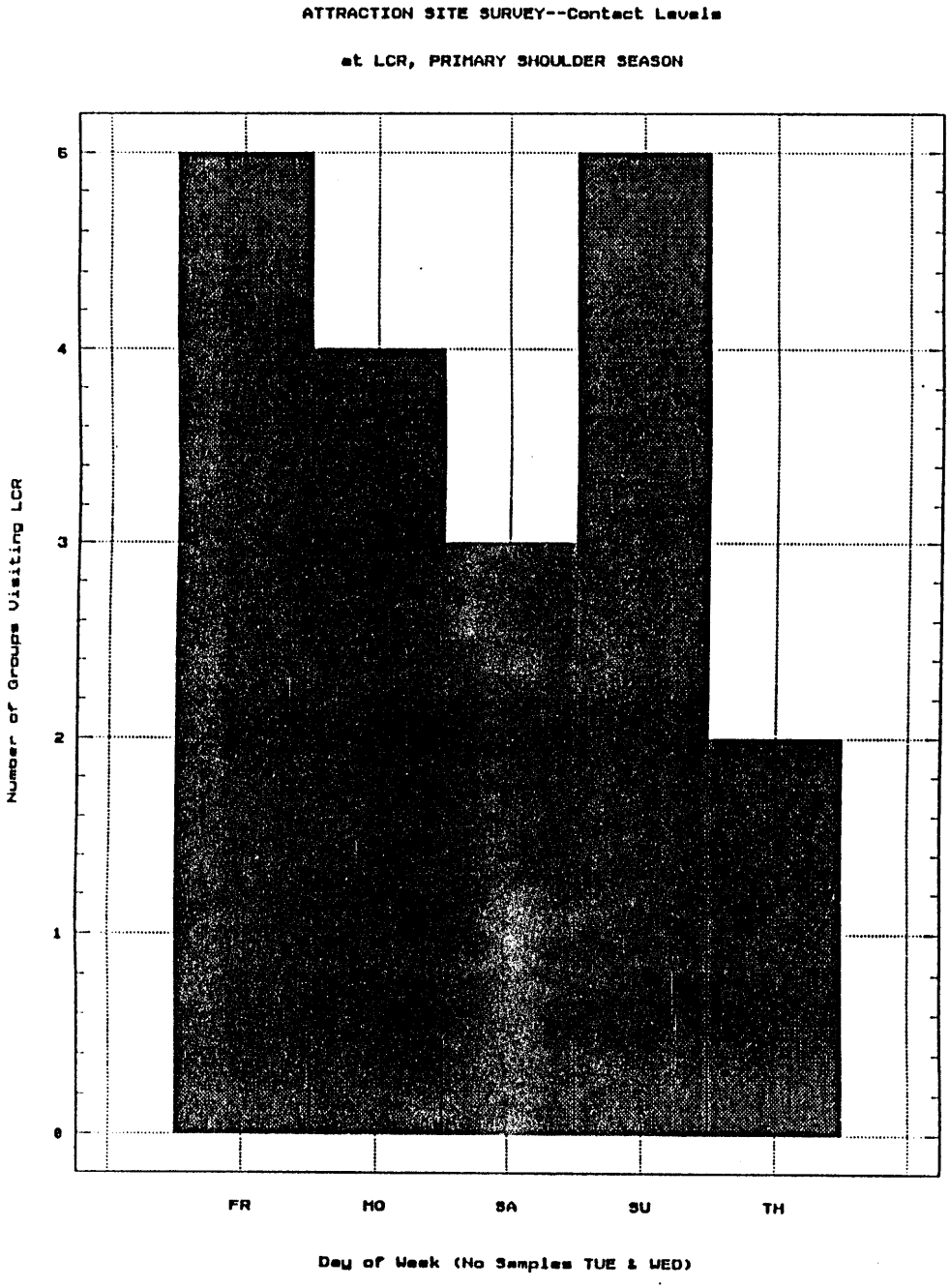


Figure 7a

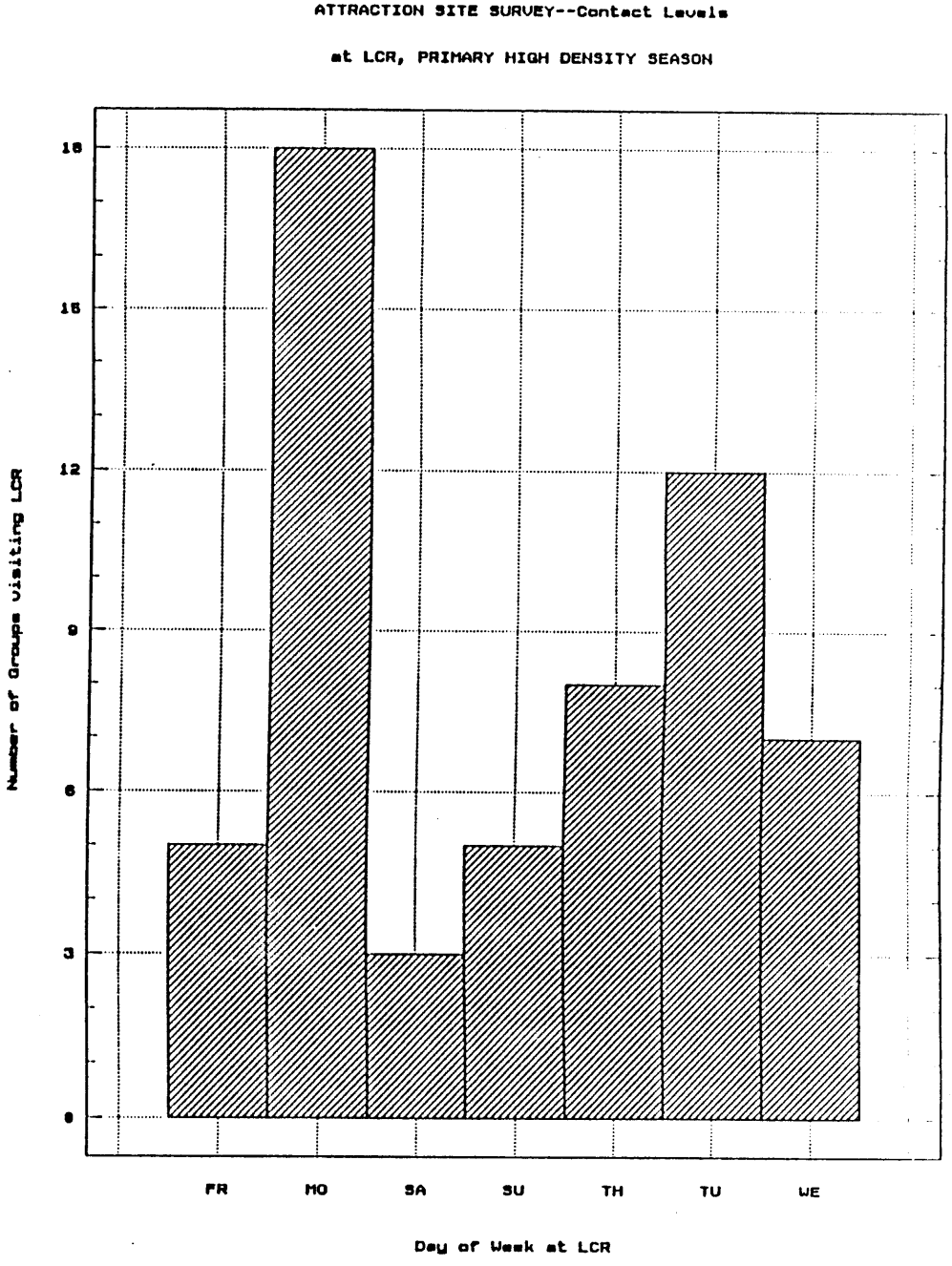


Figure 7b

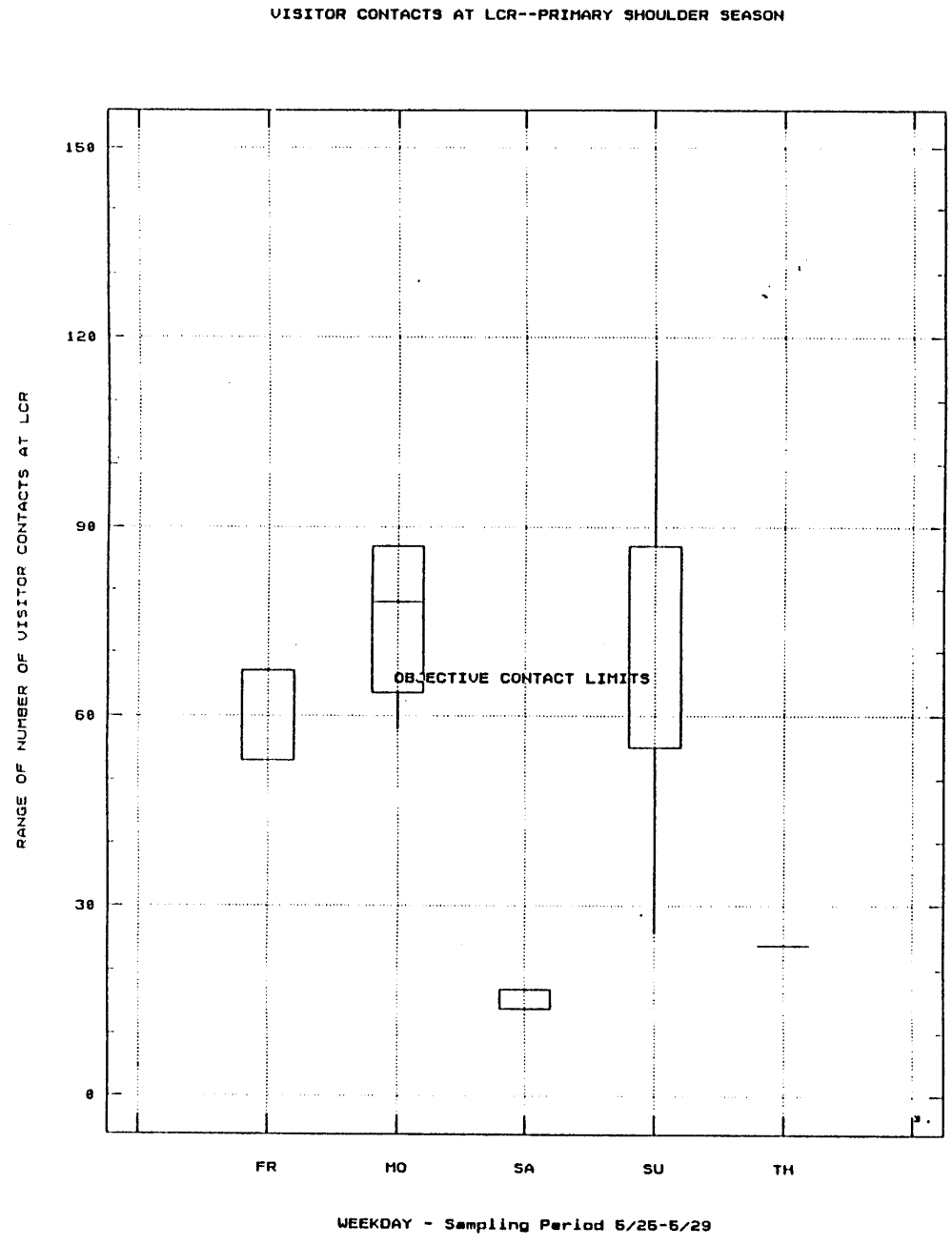


Figure 8a

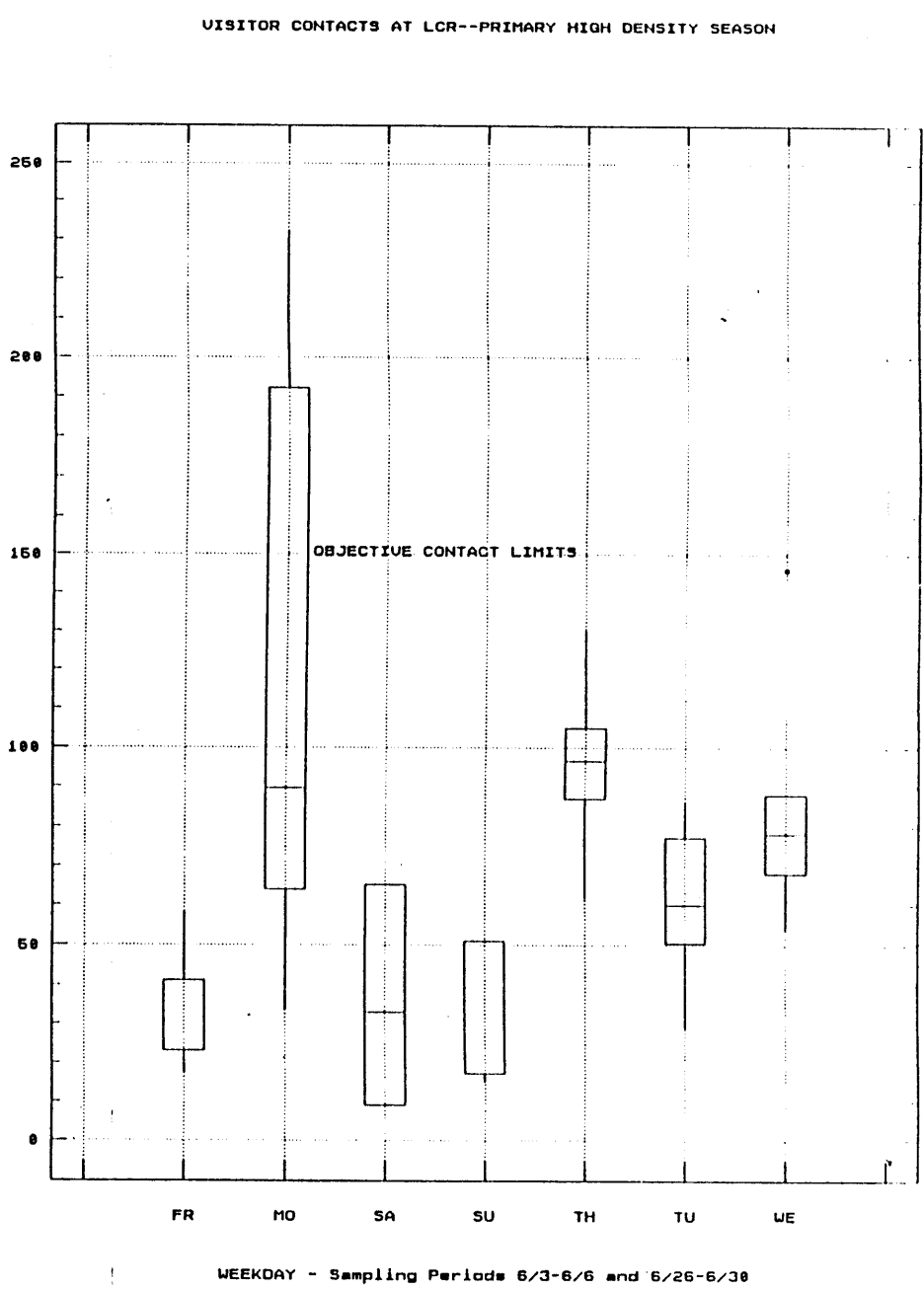


Figure 8b

Table 6a: Sample of Data Collected at LCR: Monday, June 26*

Outfitter/Type		Launch Date	Trip Length	Number Contacted
AZRA	Motor	6/24, SAT	8 to PFY	167
MOKI	Motor	6/24, SAT	8 to PFY	203
GRCE	Motor	6/24, SAT	8 to PFY	167
GRCE	Motor	6/24, SAT	8 to PFY	167
HATC	Motor	6/25, SUN	7 to WHI	203
CANY	Motor	6/25, SUN	6 to DIA	167
CANY	Motor	6/25, SUN	6 to DIA	167
DIAM	Motor	6/25, SUN	DH,4 to DIA	203
WHIT	Motor	6/25, SUN	7 to PFY	97

*All trips visited LCR between 1400 and 1700 hours.

Table 6b: Sample of Data Collected at LCR: Thursday, June 29*

Outfitter/Type		Launch Date	Trip Length	Number Contacted
OUTD	Oar	6/26, MON	12 to PFY	74
Private	Oar	6/26, MON	Unknown	74
AZRA	Oar	6/26, MON	13 to DIA	110
MOKI	Oar	6/26, MON	14 to PFY?	89
WRAD	Motor	6/27, TUE	8 to PFY	53
DIAM	Motor	6/28, WED	7 to DIA	75
WEST	Motor	6/28, WED	6 to WHI	89
WEST	Motor	6/28, WED	6 to WHI	89

*All trips visited LCR between 0900 and 1430 hours and are more representative of typical use patterns.

Although several trips visited the LCR each day, the use was typically spread out throughout the day. Only on one observation day during the high density season, June 26, the number of contacts were exceeded. This situation seen in table 6a, clearly illustrates that trips of similar types and lengths launching together will result in high contact (and sometimes unacceptable) levels. Although it is believed that the observation period was adequate, and the launch scenario is consistent throughout the high density period, i.e. there is consistency in the numbers and types of trips typically launching on Saturday, Sunday and Monday, a longer observation period may be scheduled to support the data.

During the sampling period in May (shoulder season), contact levels were quite variable. In terms of the management objectives, the contact levels exceeded the defined limits during 38% of the sampling period. It is important to note that these high contact levels occurred on Sunday and Monday, affected by trips that launched on Saturday and Sunday.

In examining the commercial launch calendar, we can see that during the shoulder season, most of the use occurs in May as opposed to mid-August through September, when commercial motor use tapers off. To obtain better data for the shoulder months, a second sampling period needs to be scheduled during the later shoulder months, August and September.

2. Elves Chasm

Elves Chasm, a lush grotto about a quarter mile from the mouth of Royal Arch Creek, is located at river mile 116. This attraction site receives the least visitation of all sites monitored. The least number of contacts between groups was also observed at this site. One reason for this is that the main pools are small and anyone familiar with the site knows that more than one group here constitutes a crowded situation. Secondly, Elves Chasm cannot be seen from the river, and if a guide sees boats moored at the mouth he may not stop. It's the "what they don't know, they won't miss" syndrome. These reasons were learned by talking to river guides.

The data shows that there was little overlap in trips visiting the site. and when there was, it was for short periods of time. Commercial motor trips stopped at Elves on day 4 or 5 of the trip, while commercial oar trips visited the site on day nine. One commercial motor trip visited Elves from 3:00 to 4:00 PM on day three of the trip, obviously one of the shorter trips through the canyon. All private trips observed arrived at Elves on the ninth day of their trip.

During the 5 day observation period, 18 trips visited Elves Chasm. During this same period, 9 trips including 2 deadheads were observed passing by without stopping. On three occasions, trips passed by when no other trips were at the site. Elves Chasm was not monitored during the primary shoulder season.

3. Deer Creek

The towering falls at Deer Creek are located at river mile 136. During the observation period, all river trips stopped at this attraction site for different activities that included a short swim, a hike to the narrows or up to Dutton Springs. Some visitors ended their half day hike through Surprise Valley at Deer Creek. Once again, a clear and relatively warm water source is the main attraction. The prehistoric handprints in the narrows and structures on the hillsides are often visited at Deer Creek.

Two seven-day observation periods were scheduled at Deer Creek during primary shoulder and high density periods. Commercial

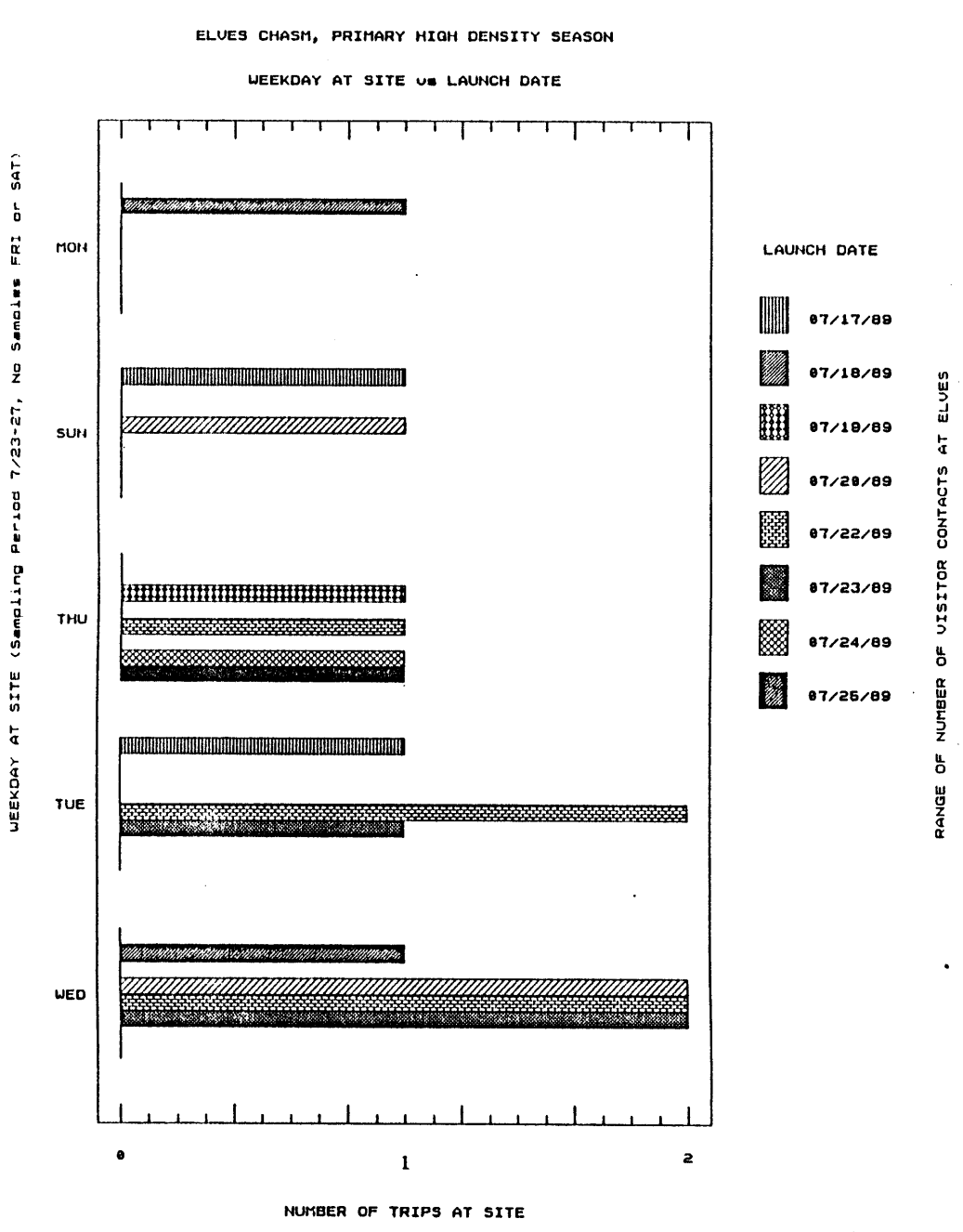


Figure 9

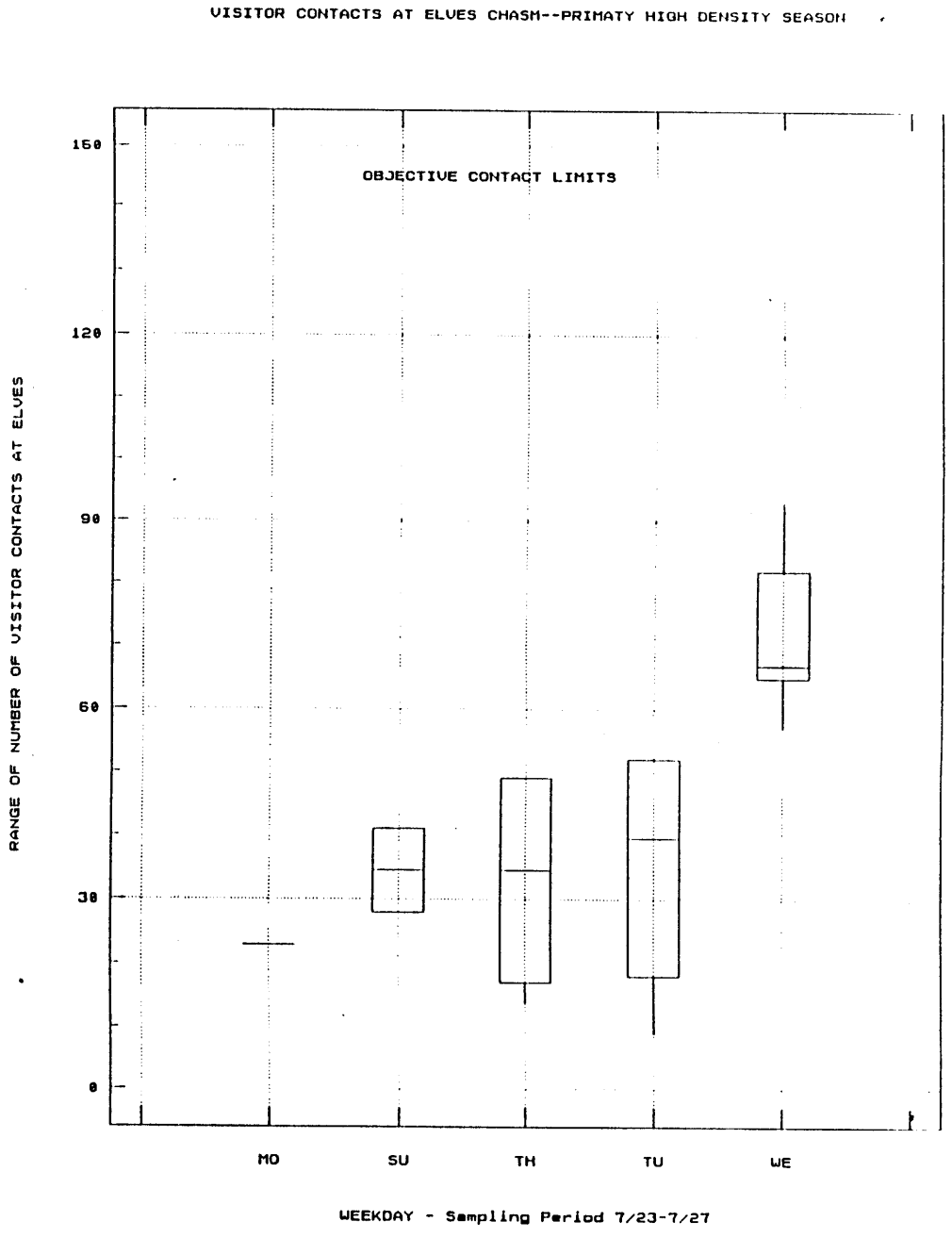


Figure 10

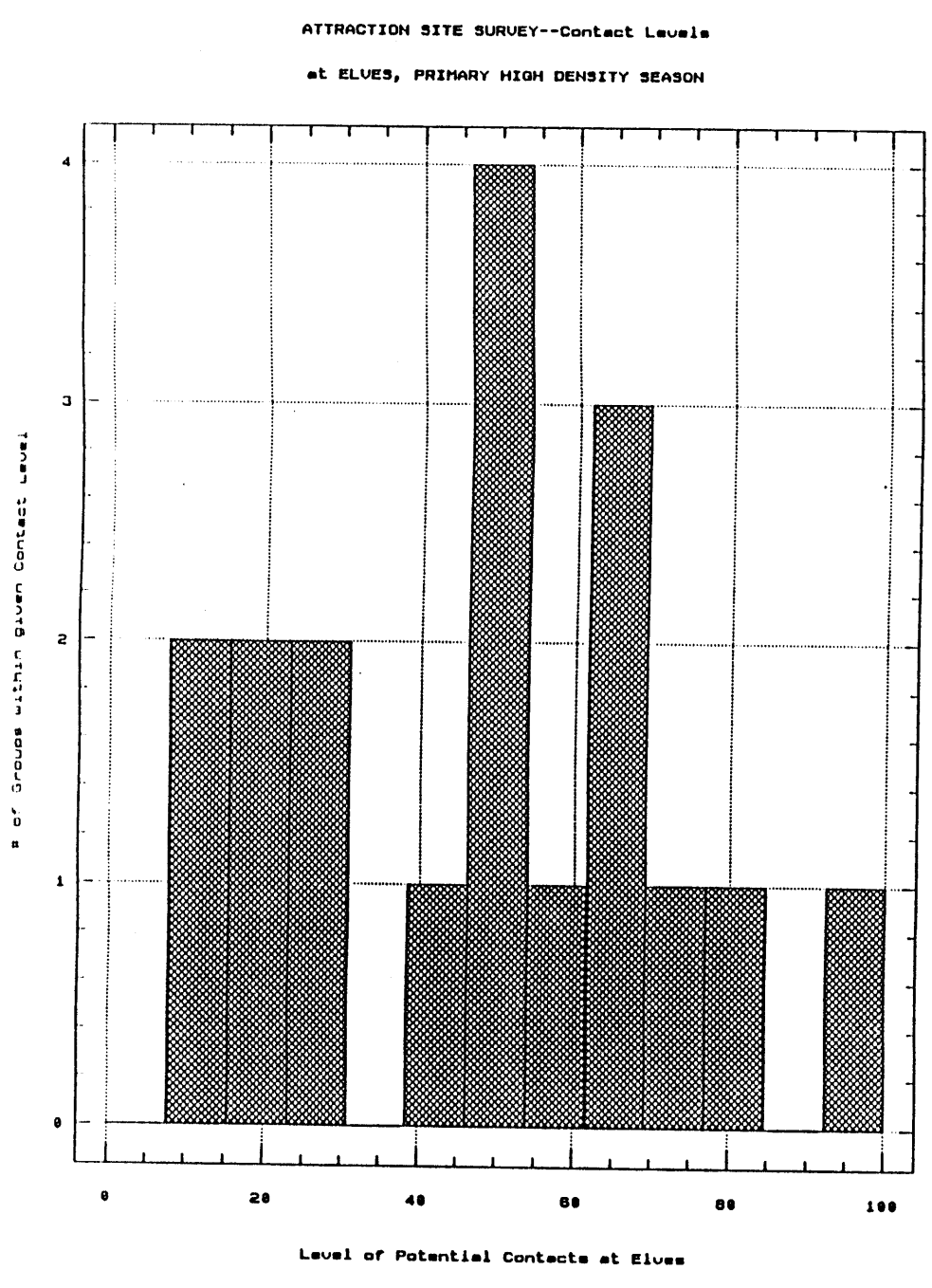


Figure 11

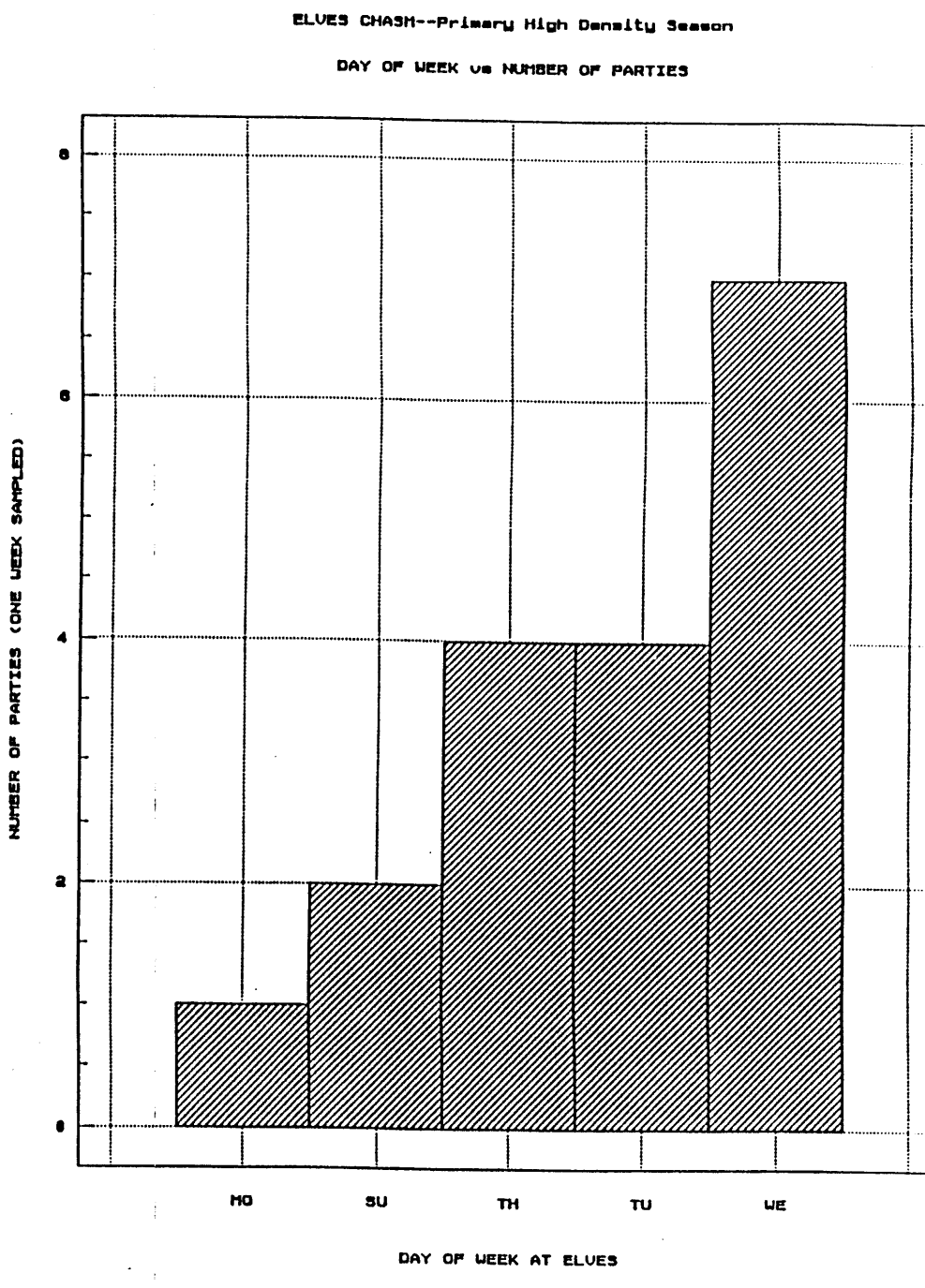


Figure 12

motor trips generally visited Deer Creek on day 4 or 5 of their trip, a few motor trips were at the site on day three. Commercial oar trips visited Deer on the 7th, 8th or 9th day and private rowing trips were at the site between days nine and twelve.

Although the highest daily visitation of all attraction sites monitored was recorded at Deer Creek, the actual numbers each trip contacted were barely under the CRMP limits. For example, on Wednesday, June 21, nine commercial motor trips visited Deer Creek. Five of nine launched on the previous Saturday, three on Sunday and one on Monday (see Table 7). A total of 233 people in 14 motor boats visited Deer Creek that day.

Table 7a: Sample Data Collected at Deer: Wednesday, June 21

Outfitter/Type		Launch Date	Trip Length	Number Contacted
SLEI	Motor	6/17, SAT	8 to PFY	71
SLEI	Motor	6/17, SAT.	8 to PFY	71
GRCE	Motor	6/17, SAT	8 to PFY	124
GRCE	Motor	6/17, SAT	8 to PFY	25
GRCE	Motor	6/17, SAT	8 to PFY	74
CANY	Motor	6/18, SUN	6 to DIA	54
ARIZ	Motor	6/18, SUN	6 to DIA	133
HATC	Motor	6/18, SUN	7 to WHI	90
TOUR	Motor	6/19, MON	5 to LAV	74

Table 7b: Sample Data Collected at Deer: Saturday, June 24

Outfitter/Type		Launch Date	Trip Length	Number Contacted
CAEX	Oar	6/16, FRI	14 to DIA	86
AZRA	Oar	6/16, FRI	13 to DIA	86
SLEI	Motor	6/20, TUE	8 to PFY	86
SLEI	Motor	6/20, TUE	8 to PFY	86

During the sampling period in early May (shoulder season), use levels were lower, but high contact levels existed at Deer Creek. In terms of the management objectives, the defined limits were exceeded on two specific days - a Saturday and Wednesday. The correlation with launch date once again exists. On Wednesday, May 10 for example, five commercial motor trips visited Deer; four of these trips launched on the previous Saturday, one on Sunday. The number of contacts on these days was comparable to those during the high density season. While the objective is to manage for medium density during the shoulder season, the visitor experienced high density contact levels at this time.

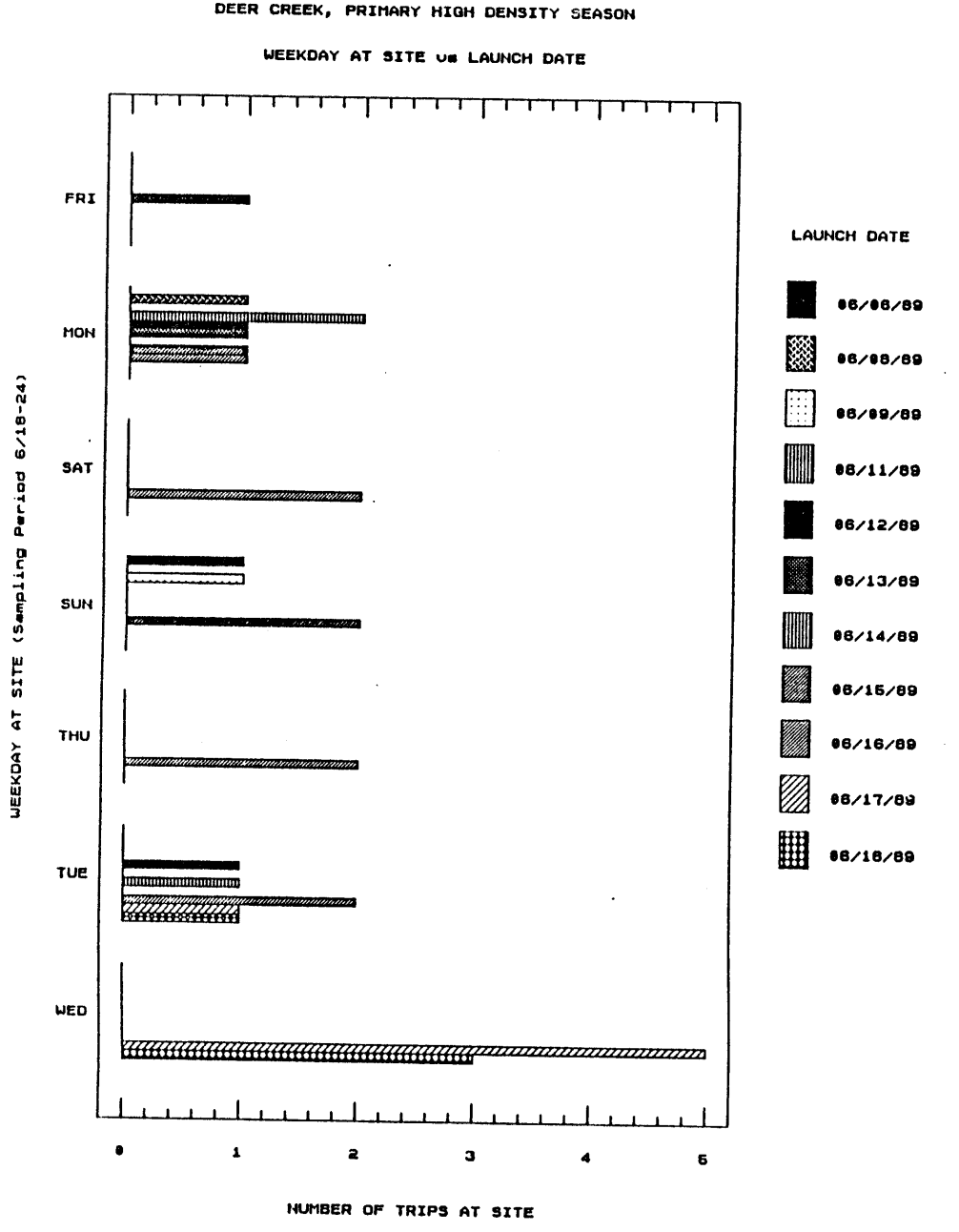


Figure 13a

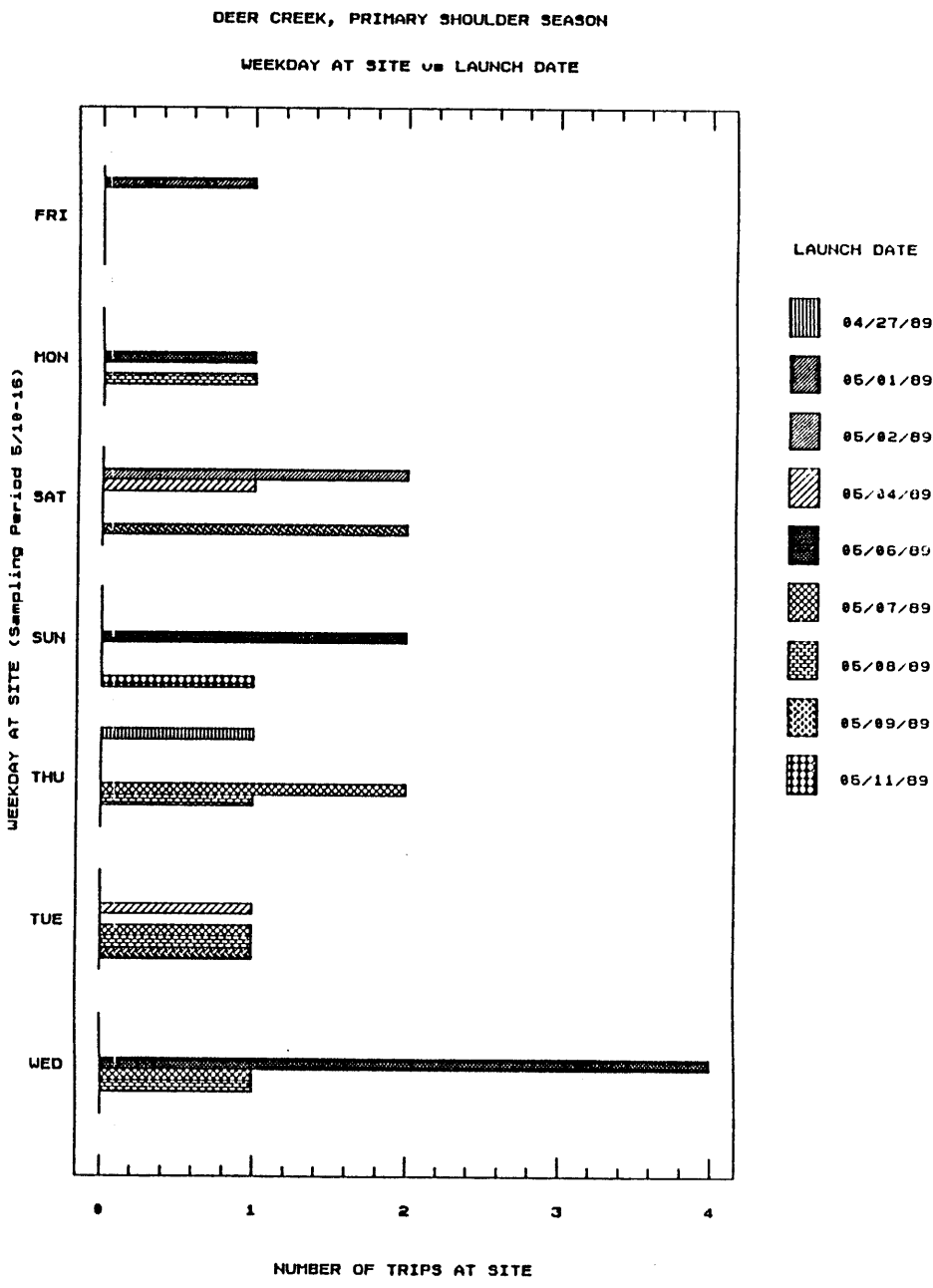


Figure 13b

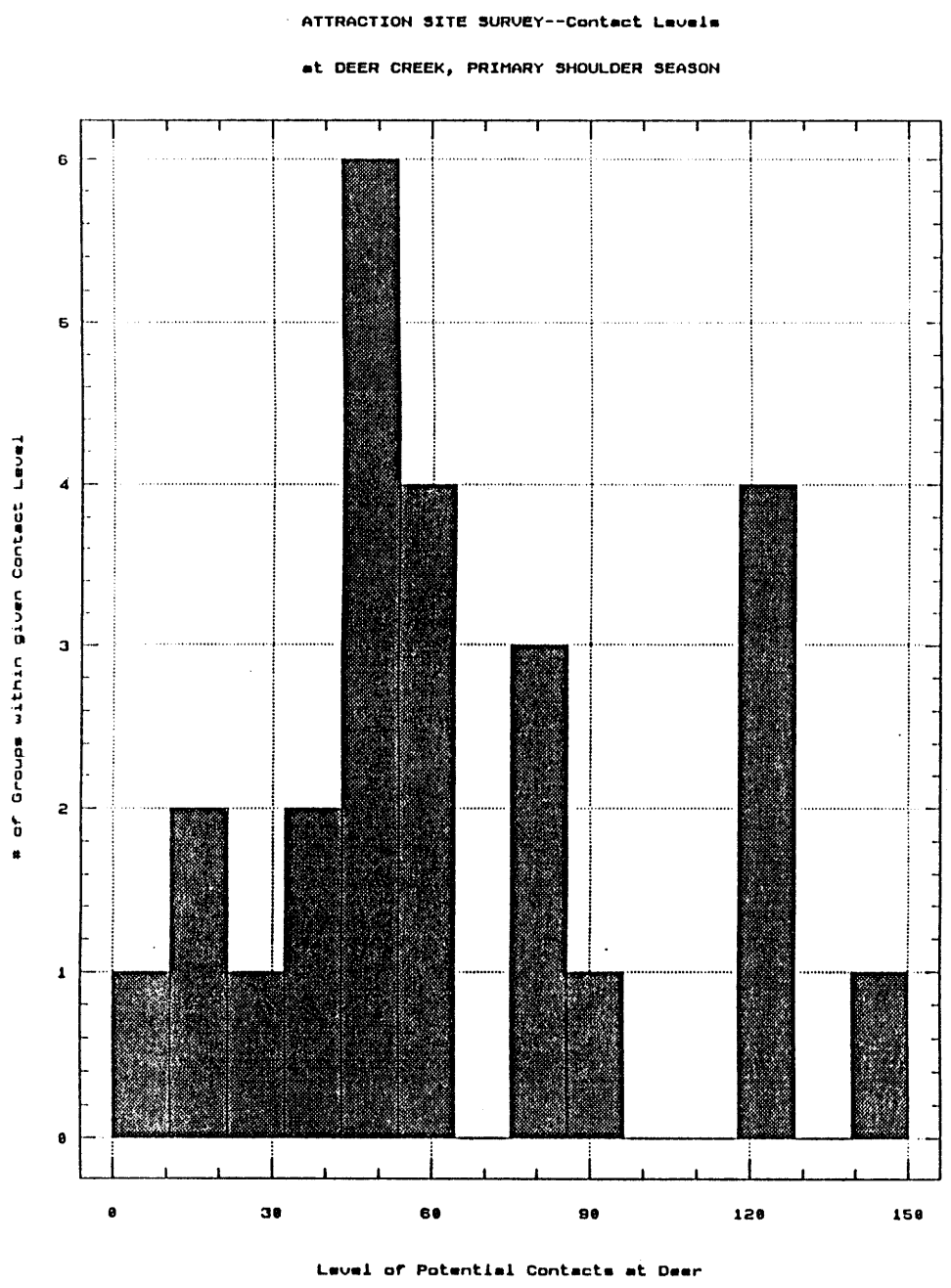


Figure 14a

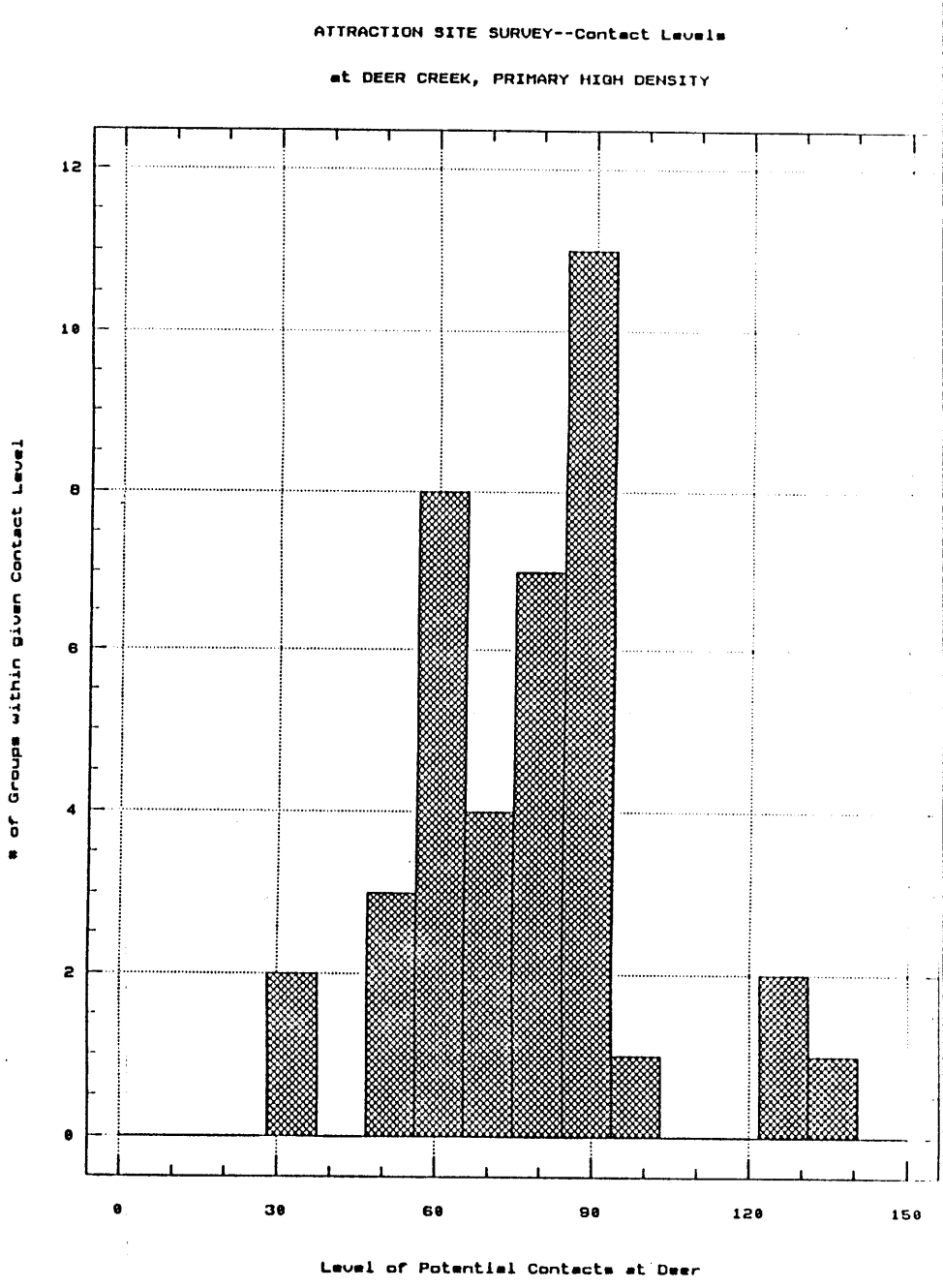


Figure 14b

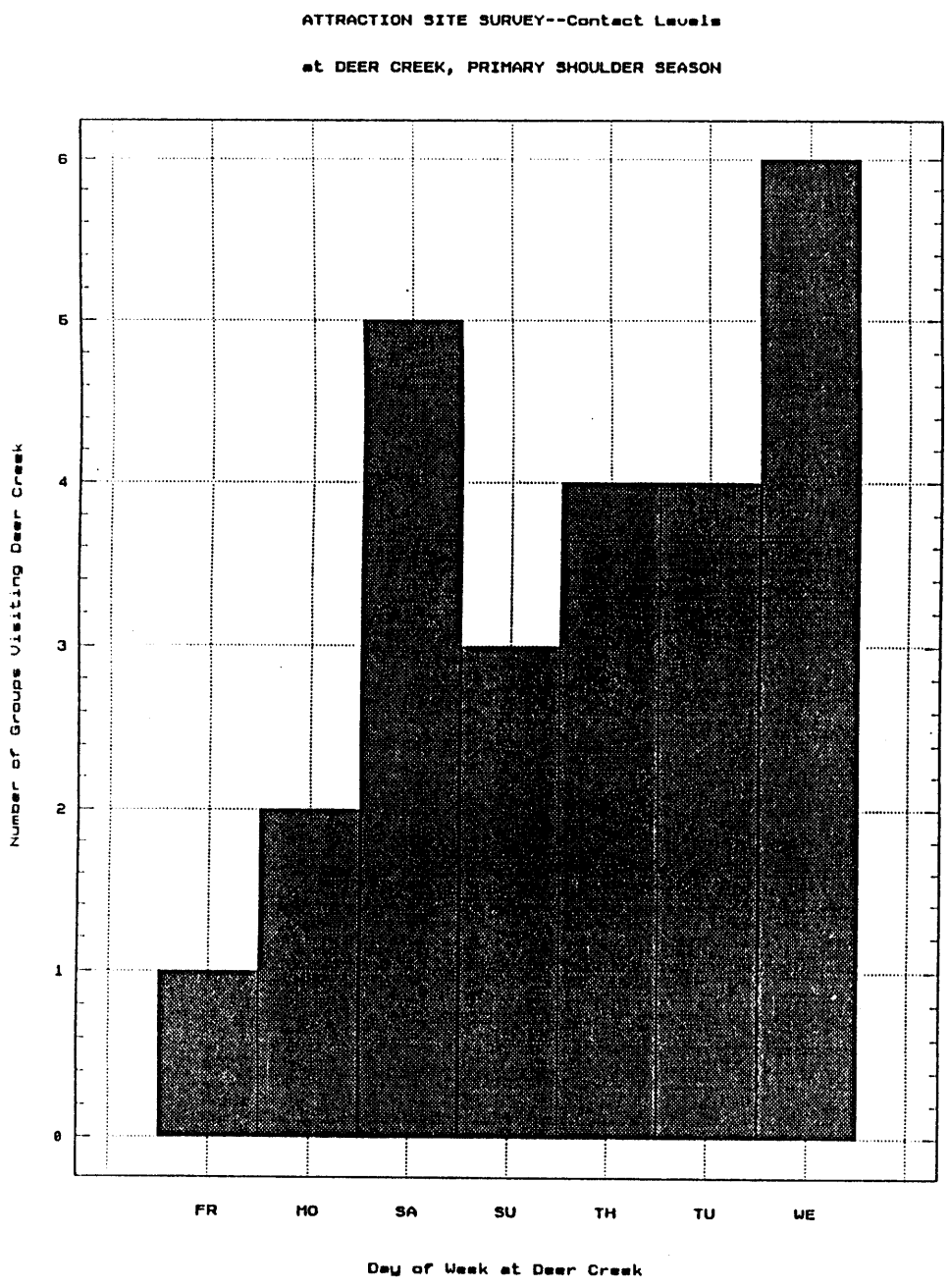


Figure 15a

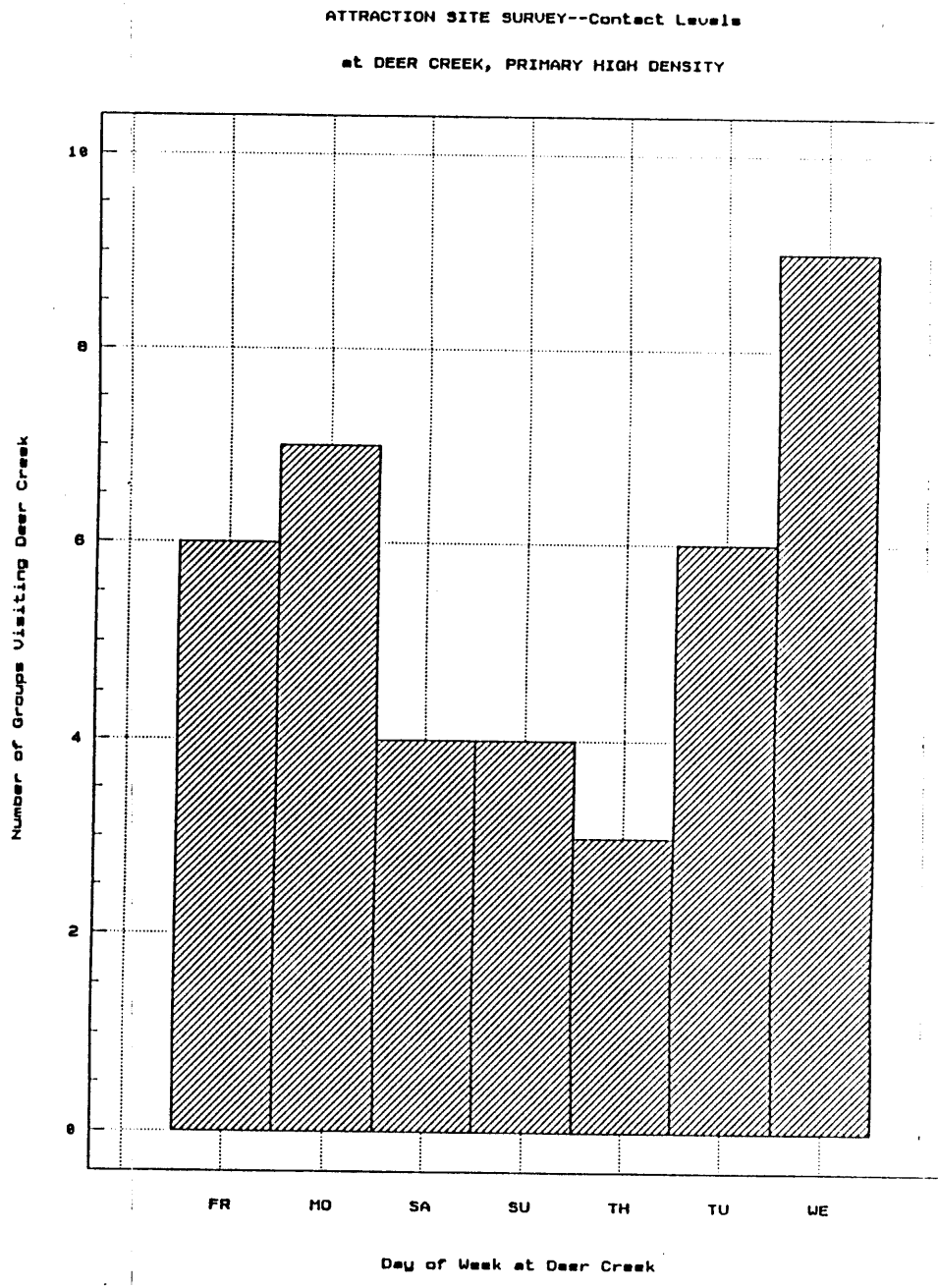


Figure 15b

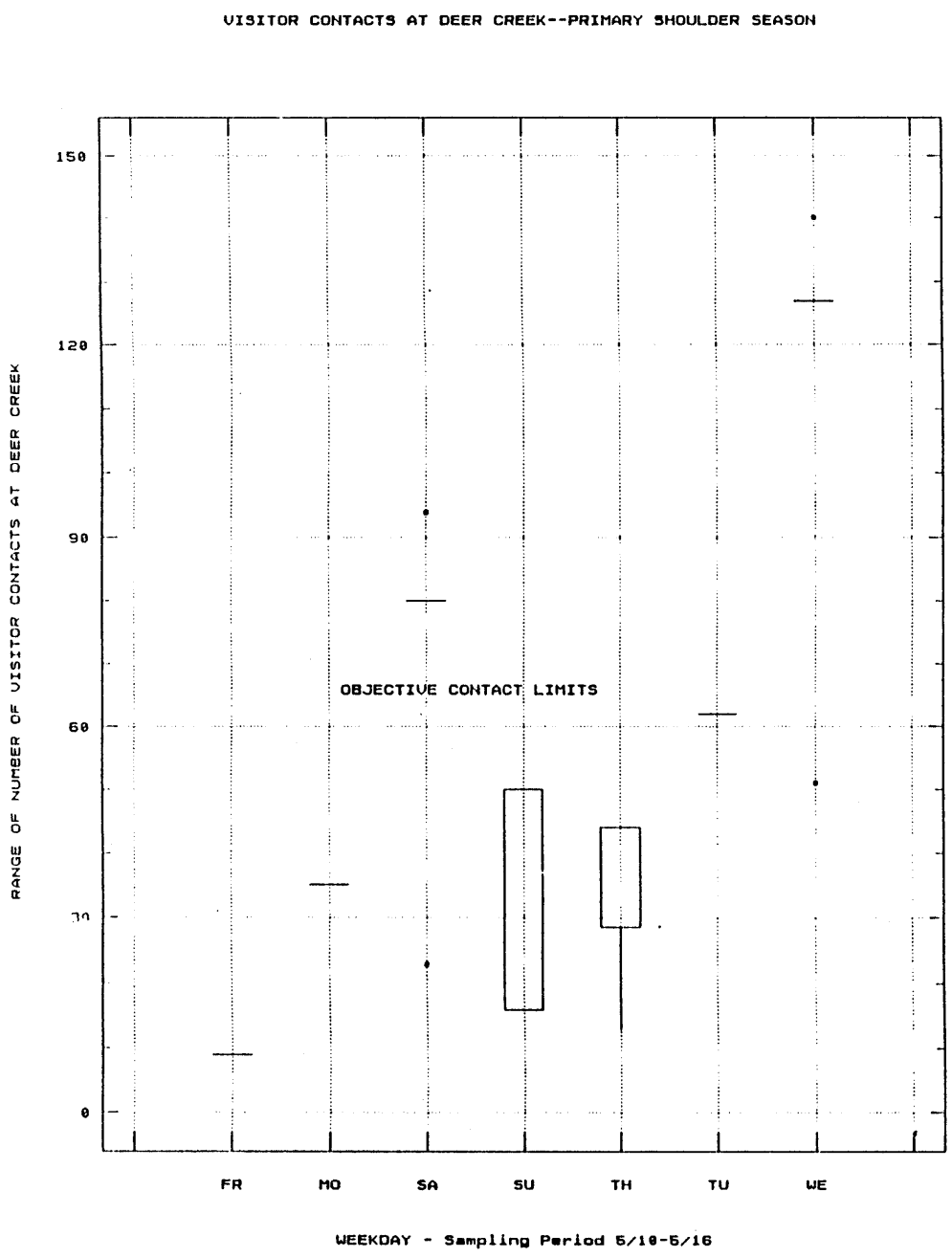


Figure 16a

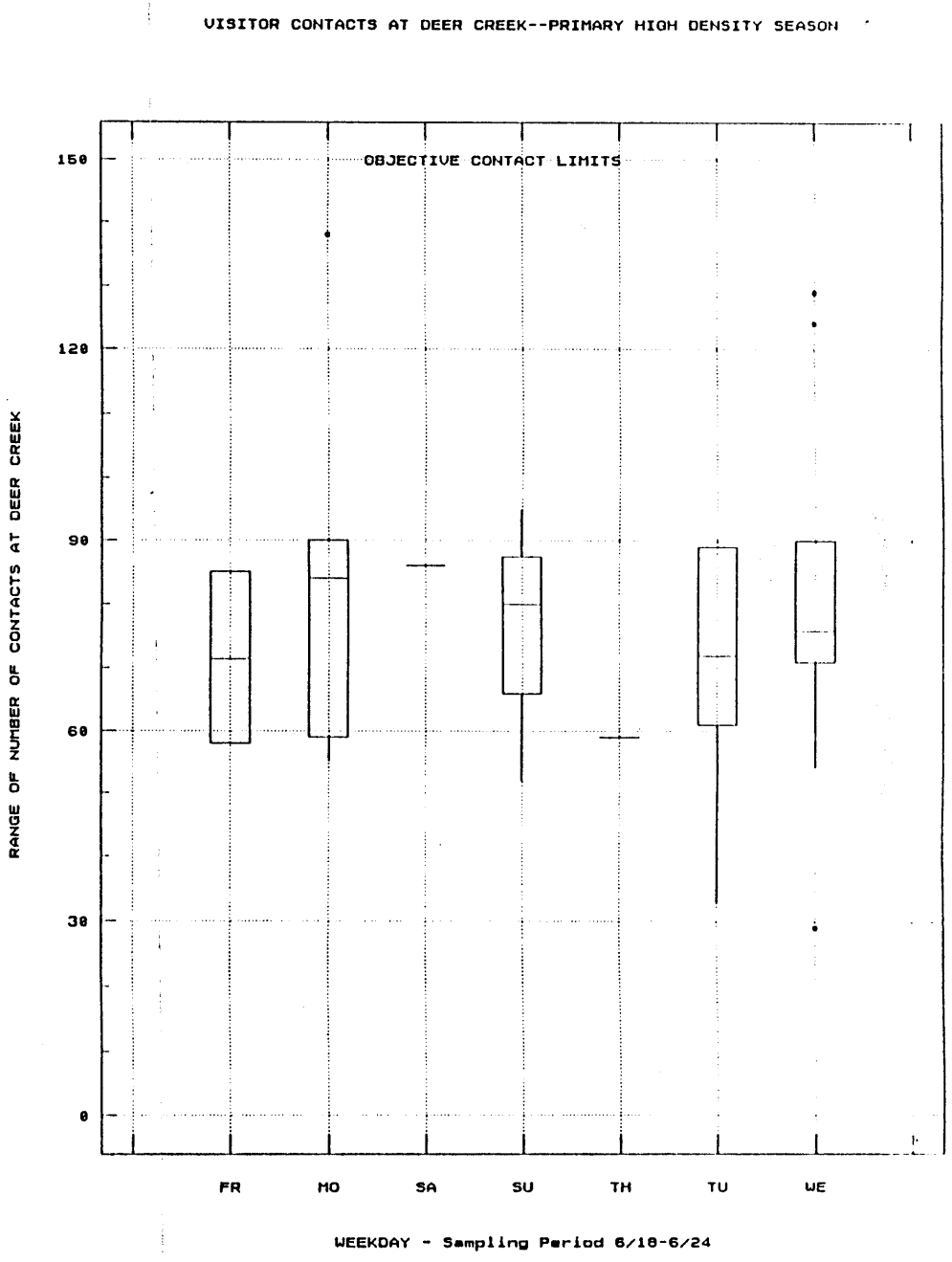


Figure 16b

It is apparent, that trips of the same length and type travel on similar schedules, but possibly make adjustments for crowding at attraction sites. Experienced guides will tell us this.

Another feature of Deer Creek that makes the area seem more like a roadside attraction is the limited boat mooring area. Quite often boats will tie-up just upstream and across the river and wait for room on the beach to moor at Deer. Boats ferry across river and jockey for a position at the site, creating a "traffic jam" scenario in the wilderness. One wonders about the impression such a scene has on the visitor.

4. Havasu Creek

Havasu Creek is yet another beautiful place on earth, and part of the Grand Canyon experience. The mouth of Havasu Creek is located at river mile 156.8. Visitors hike into the canyon to view the lush vegetation and travertine falls, and to swim in the various pools of the creek. Most groups go to the first major swimming hole: "Ruby" or the "Big Kid's" pool. Others venture a half day hike to Beaver Falls, and some spend a full day hiking to Mooney Falls below Supai Village.

Observation periods were scheduled in May and July during the primary shoulder and high density seasons. During the high density season, visitation of 40 trips was monitored in a seven day period. Commercial motor trips stopped at Havasu between days 4 and 7 of their trip. Commercial oar trips visited the site on the ninth or tenth day. Of the seven private trips observed, visitation occurred between days 11 and 15. Only one deadhead was observed at 7:30 pm passing by Havasu without stopping.

For Havasu, the shoulder season limits differ from the other attraction sites. The levels are set at 90% probability of contacting 50 to 100 people. During the monitoring period, these limits were exceeded in 52% of the samples taken. In other words, in over half the sample period at Havasu (mid-May), visitors experienced contact levels equivalent to the high density period. On Thursday, May 18, the contact levels exceeded the defined high density levels. (See table 8a below.) A total of nine trips visited Havasu that day; four commercial motor trips that launched on the previous Sunday.

During the high density season, the greatest number of trips recorded in one day was seven. On Thursday, July 28 the number of contacts made by three separate groups exceeded the CRMP limits. On a few other occasions during the monitoring period, the number contacted was slightly less than 150 people.

Table 8a: Sample Data Collected at Havasu: Thursday, May 18*

Outfitter/Type		Launch Date	Trip Length	Number Contacted
Private	Motor	5/6, SAT	18 to DIA?	104
GRCD	Oar	5/8, MON	12 to PFY	167
Private	Oar	5/10, WED	18 to DIA?	124
WRAD	Oar	5/10, WED	10 to WHI	167
GRCE	Motor	5/13, SAT	8 to PFY	103
WEST	Motor	5/14, SUN	6 to WHI	167
WHIT	Motor	5/14, SUN	7 to WHI	153
WHIT	Motor	5/14, SUN	7 to WHI	153
WEST	Motor	5/14, SUN	6 to WHI	167

* Primary Shoulder Season

Table 8b: Sample of Data Collected at Havasu: Friday, July 28*

Outfitter/Type		Launch Date	Trip Length	Number Contacted
Private	Oar	7/14, FRI	18 to DIA	145
GRCE	Motor	7/22, SAT	9 to PFY	69
HATC	Motor	7/23, SUN	7 to WHI	107
HATC	Motor	7/23, SUN	7 to WHI	107
GEOR	Motor	7/24, MON	6 to WHI	107
GEOR	Motor	7/24, MON	6 to WHI	107
ADVW	Motor	7/25, TUE	5 to WHI	69

*The creek flashflood the night before, and was high and muddy. All trips stopped although the average time spent at the site was considerably lower.

Like Deer Creek, the "parking" is tight at the mouth of Havasu Creek, but not as limited. Some of the large motor rigs will pull into a small eddy about two hundred yards downstream. On one day, a total of 22 oar and 5 motor rigs were tied up at the mouth of Havasu. The section of river above Havasu affords poor camping opportunities. In planning camps here, guides must be aware of trips ahead and behind them. The "set-up" corridor for Havasu extends from "Matkat hotel" about seven miles upstream to "You Got to be Kidding" camp, just 300 yards from the mouth. It is likely that most camps in that section are used each day during the high density season. Motor trips camped upstream as far as Poncho's actually arrive at Havasu midmorning. The camping situation below Havasu is limited for several miles downstream as well.

Although up to 200 people have been recorded at Havasu Creek during the same time period, the use is dispersed in three main areas: the lower pools, Beaver and Mooney Falls. During the observation period, three groups hiked to Mooney, and ten

groups hiked to Beaver Falls. The people going to Mooney left very early in the morning and returned late afternoon, the contacts with others was usually on the return hike. The hike to Beaver takes about 4 to 5 hours and the number of contacts during the day was much greater than those hiking on to Mooney. The greatest number of contacts took place at the lower pool and at the mouth. The greatest number of people spent time at Ruby pools. On several occasions, up to 100 people congregated in this area which is less than an acre.

Summary and Conclusions

During the primary season, a group or individual may expect high levels of contacts with others despite the enormity of the canyon. Although this monitoring program does not address social carrying capacity or visitor expectations, it does consider the levels at which change in management is prompted.

The skill and knowledge of the river guides quite often contributes to the crowding situation (or lack thereof) along the river corridor and at attraction sites. Despite their efforts to provide the recreational users with a variety of experiences, the guides are inadvertently required to work within the constraints of regulated flows, trip lengths and related restrictions. It is necessary to make adjustments in order to provide the visitor with some of the more critical attributes of a Grand Canyon river trip including the opportunity to experience solitude and quiet.

Results of the Attraction Site Monitoring program indicate that management objectives regarding contact levels are not being met consistently. During the shoulder season, for all sites combined, objectives were met for 63% of the trips sampled during 53% of the time. During the high density season, for all sites combined, objectives were met for 86% of the trips sampled during 86% of the time.

The CRMP states that the lowest level of management action and intervention will be the NPS posture in assuring that recreation use impacts are within the "limits of acceptable change". Management needs to determine whether or not we aspire to meet our goals 100% of the time, or part of the time. A continuation of the attraction site monitoring program will validate the baseline data and cultivate information needed to refine the established carrying capacities.

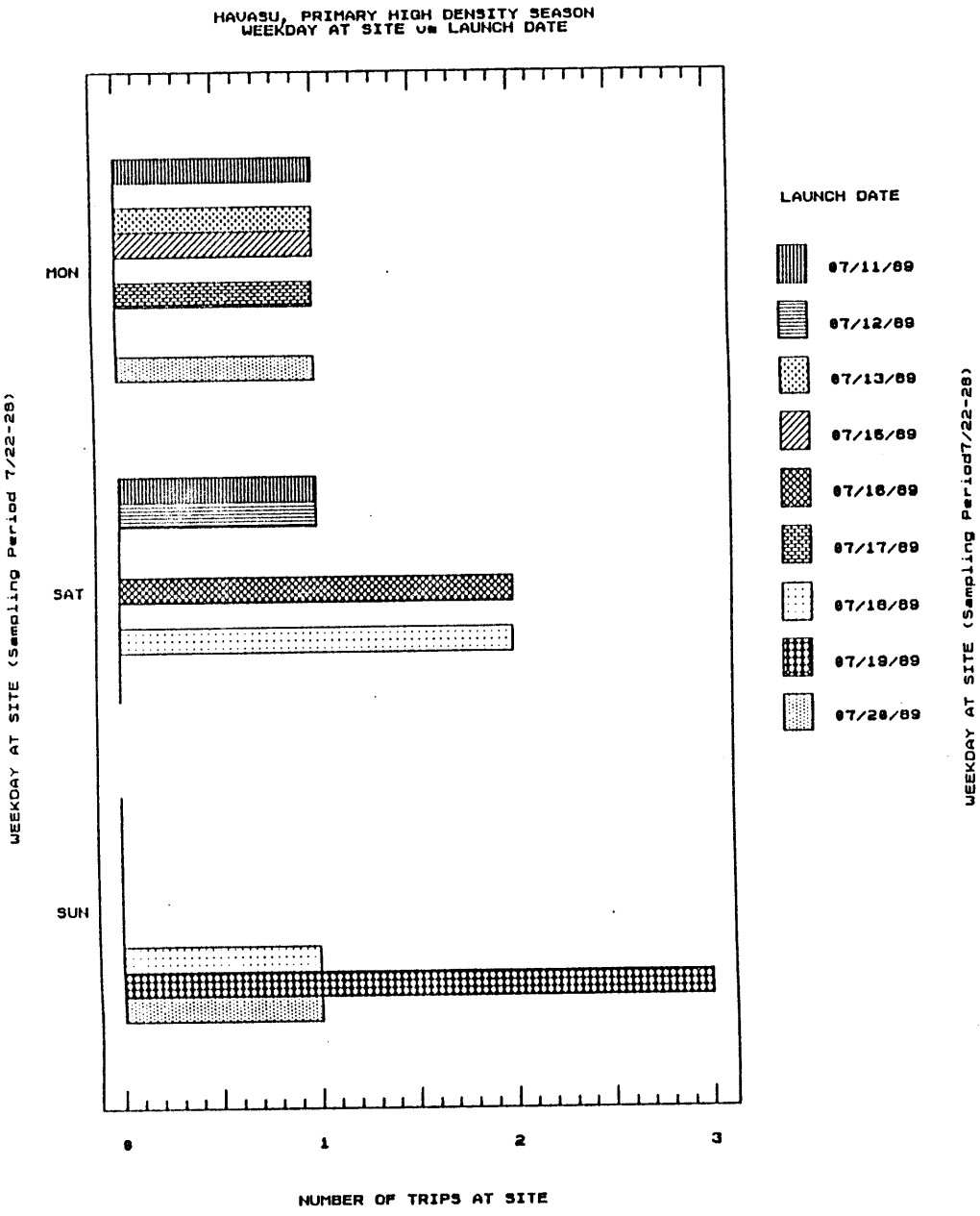


Figure 17a

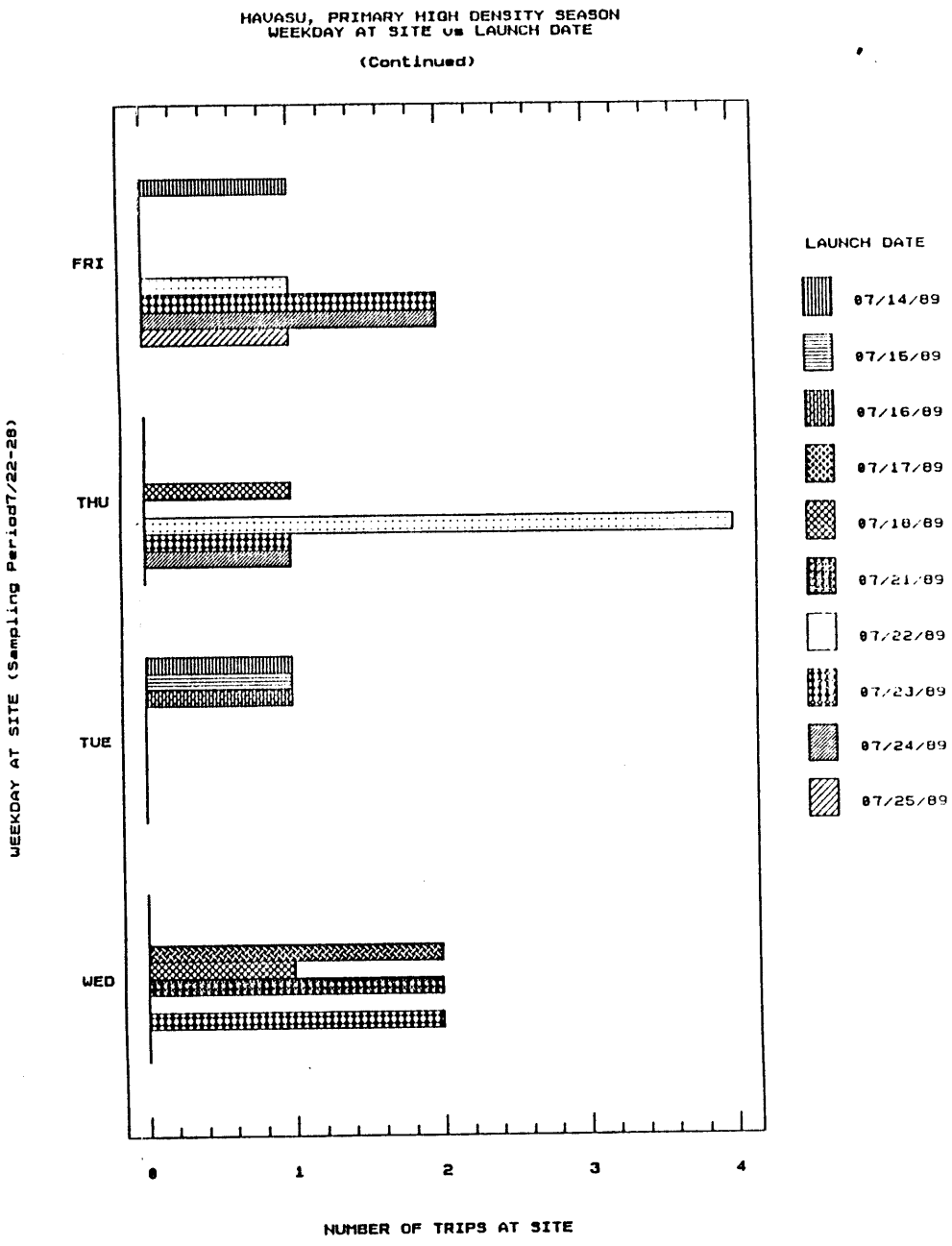
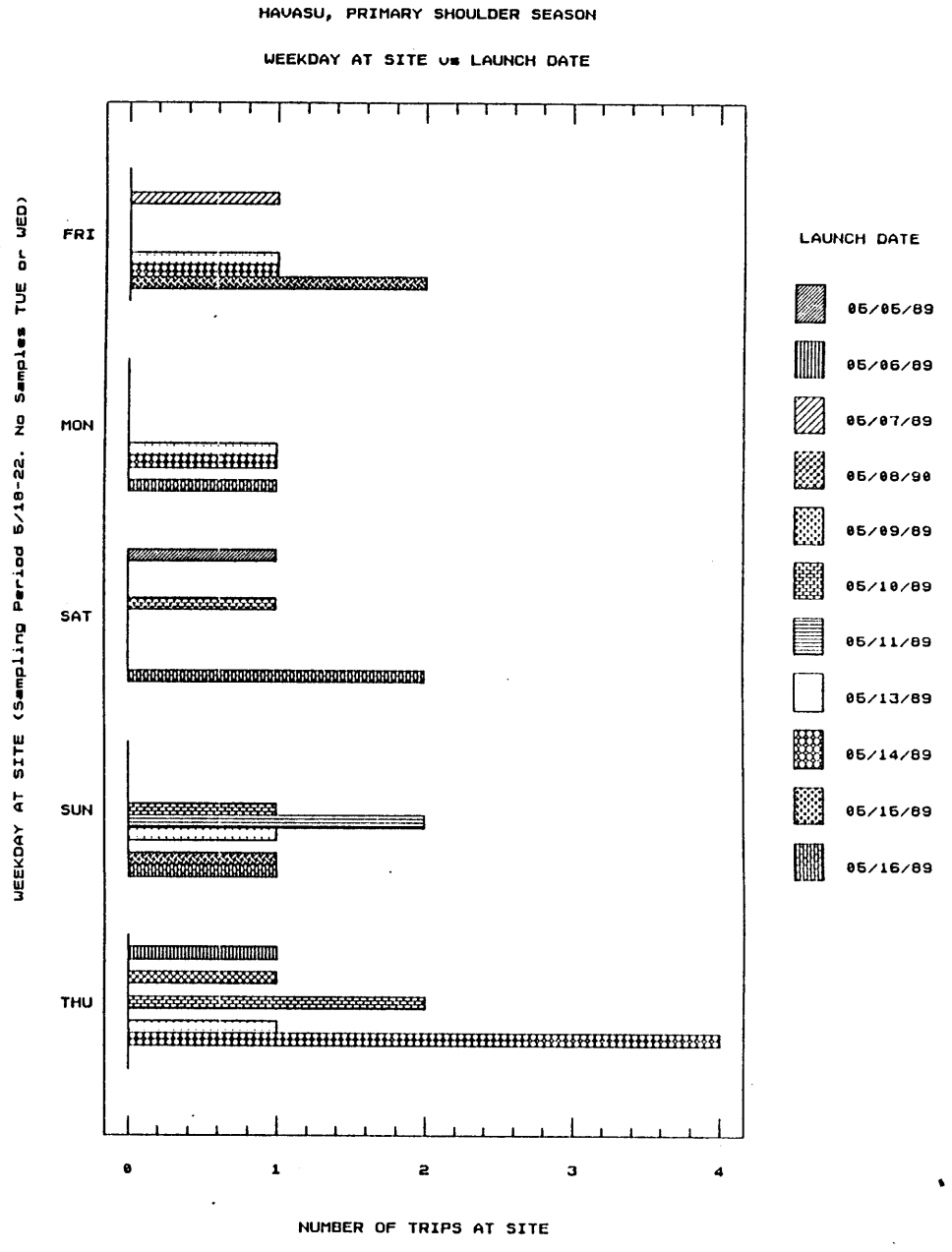


Figure 17a (continued)


HAVASU, PRIMARY SHOULDER SEASON
WEEKDAY AT SITE vs LAUNCH DATE
WEEKDAY AT SITE (Sampling Period 5/18-22, No Samples TUE or WED)
FRI
MON
SAT
SUN
THU
0
1
2
3
4
NUMBER OF TRIPS AT SITE
LAUNCH DATE
05/05/89
05/06/89
05/07/89
05/08/90
05/09/89
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05/11/89
05/13/89
05/14/89
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05/16/89

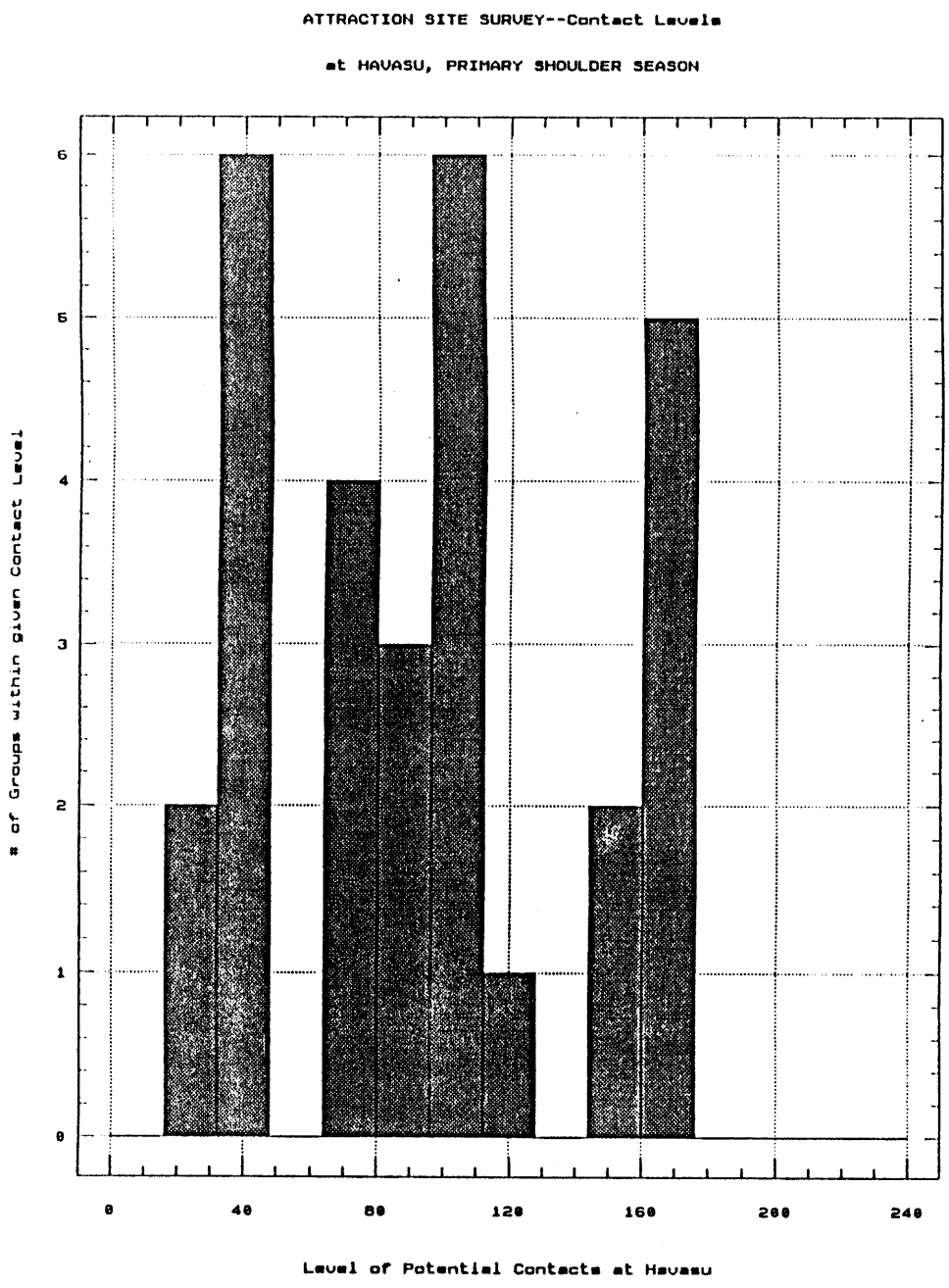

Figure 18a

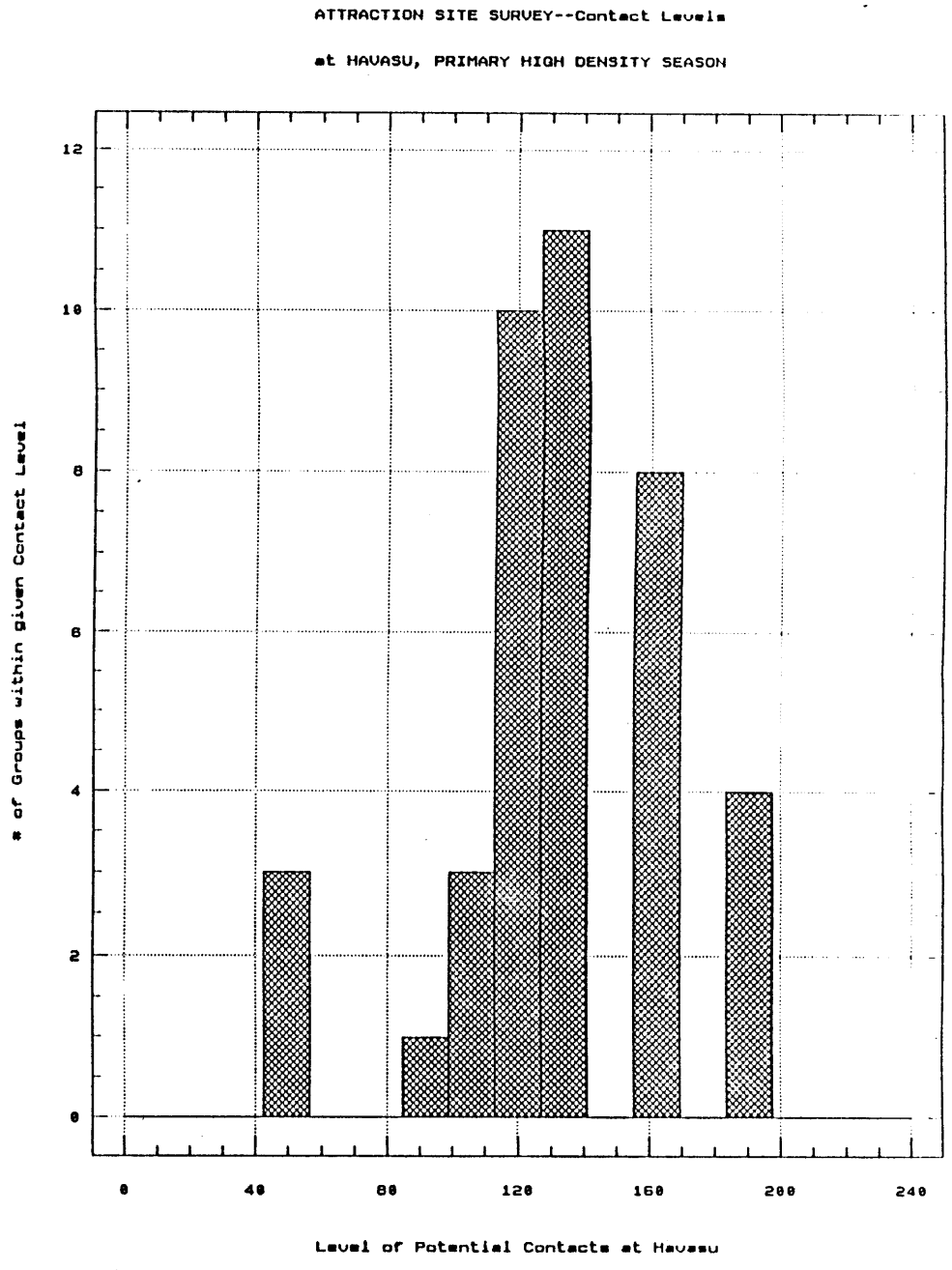

Figure 18b

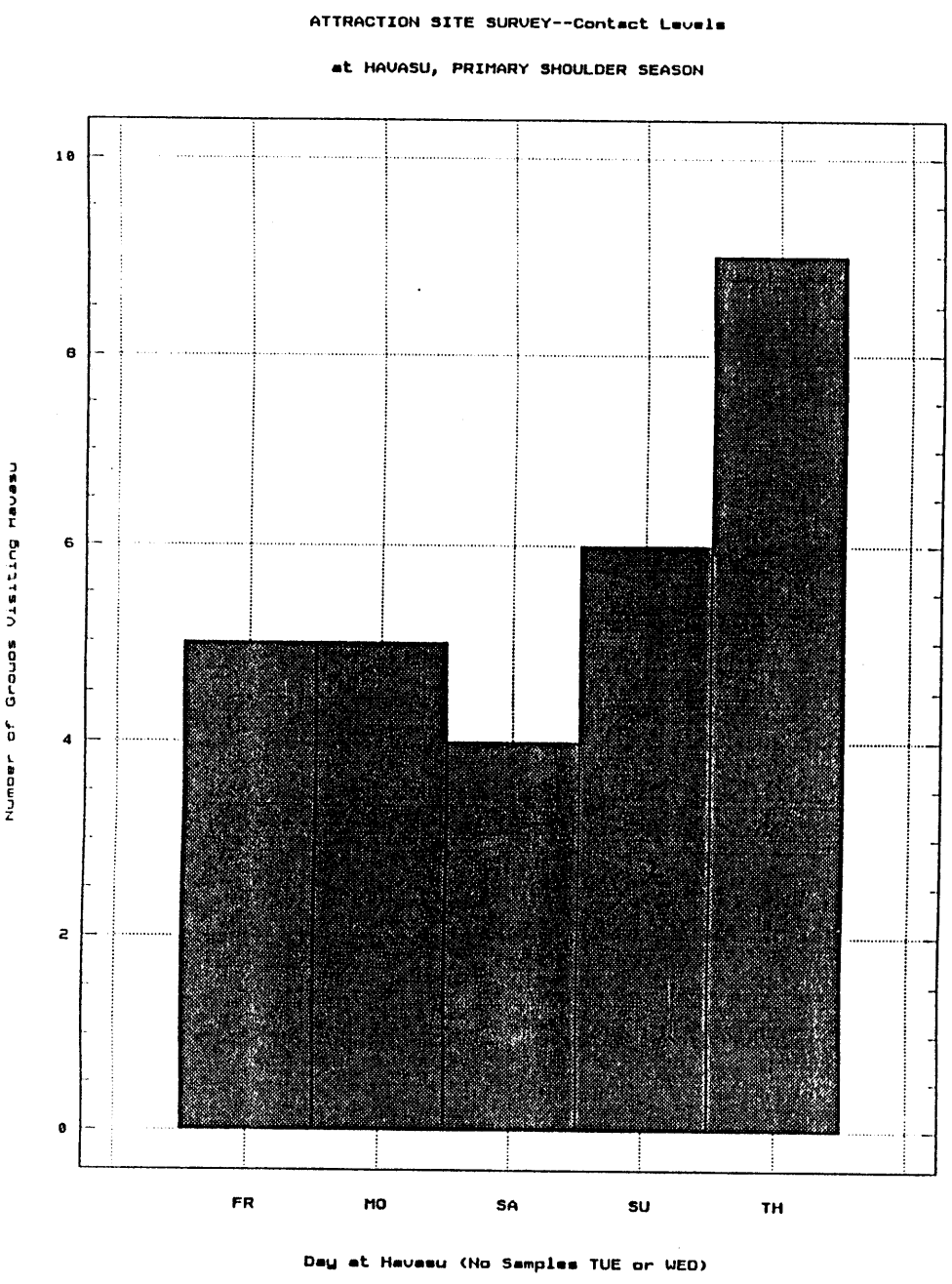

Figure 19a

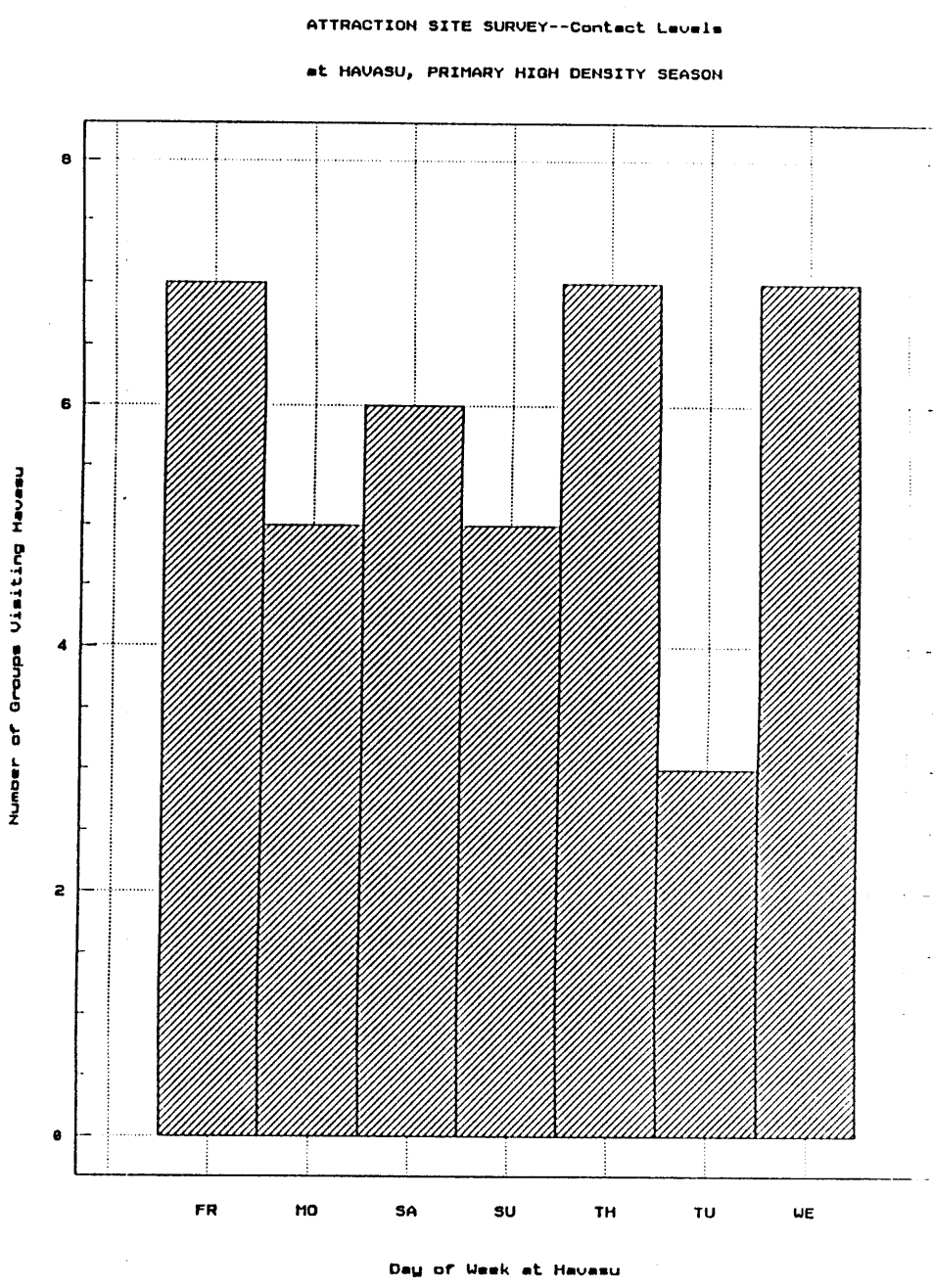

Figure 19b

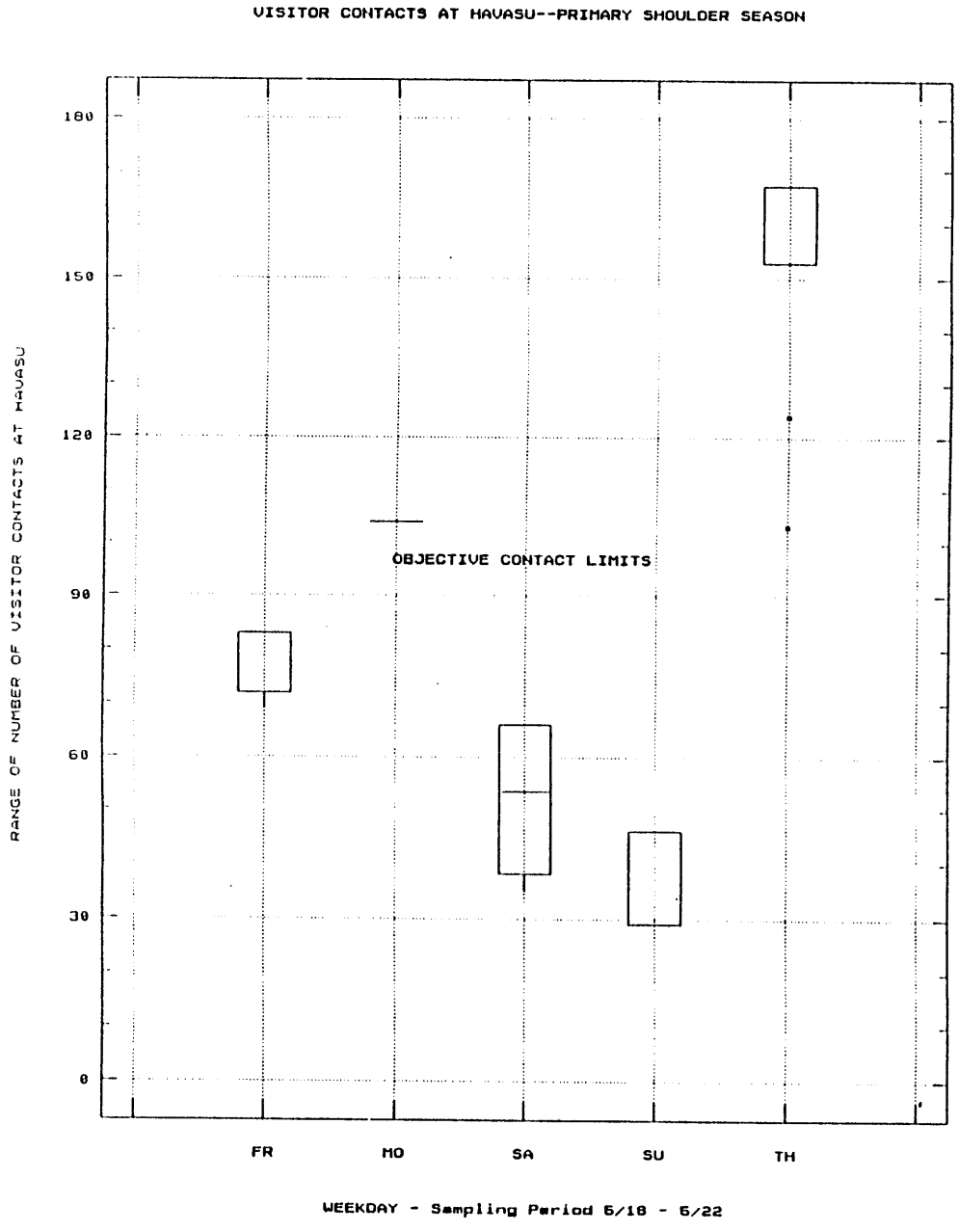

Figure 20a

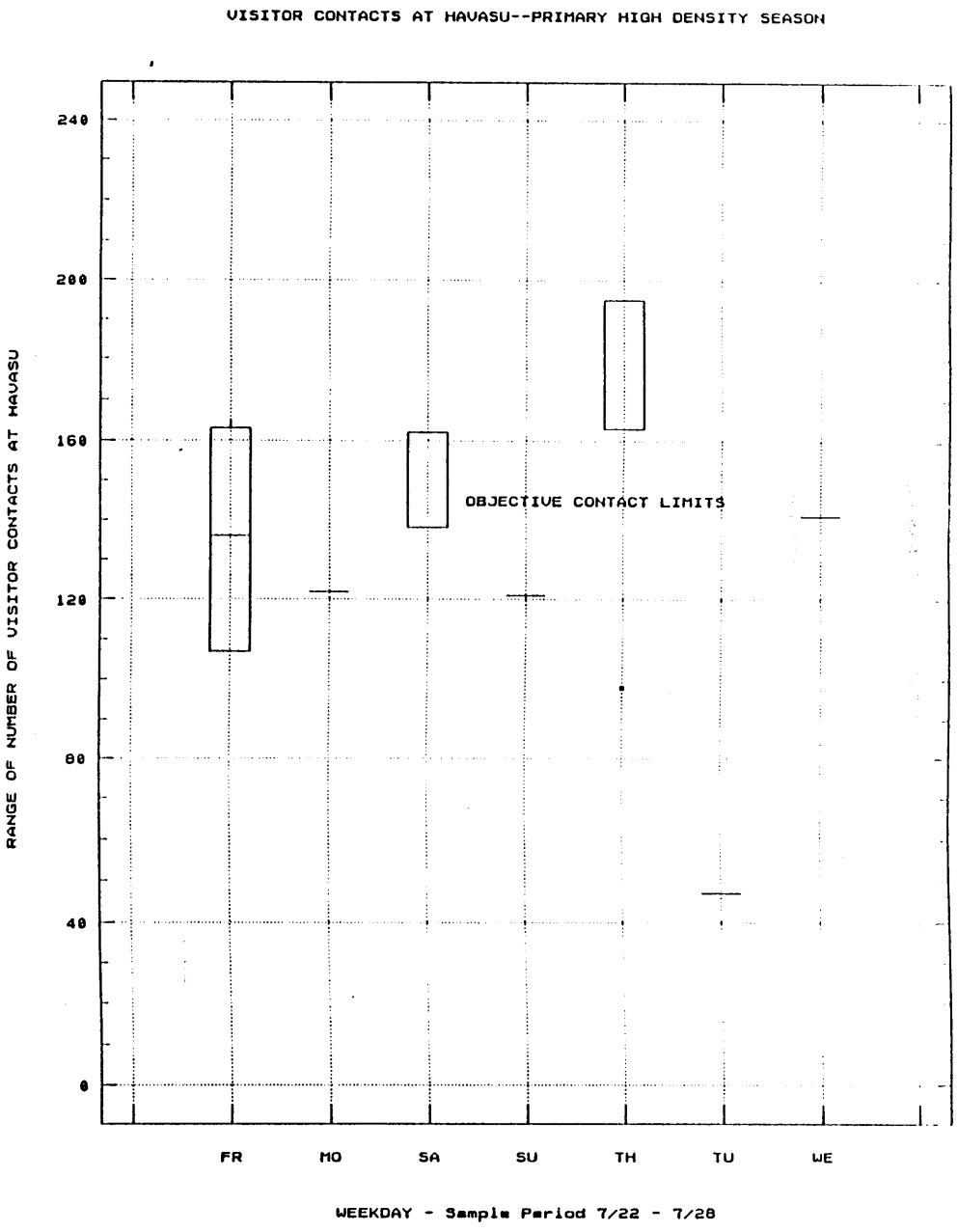

Figure 20b

Program Summary: River Contact Survey

Management Objective	Results of Monitoring
Primary High Density Season	
80% probability that a party will contact up to 7 parties per day on river	Objective met: On 88% of sampled days, the groups had contacts with less than 7 parties. Of the 33 trips responding, 21 experienced a day or days where the objective contact limit was exceeded; this occurred 43 of the total 361 days.
Primary Shoulder Season	
80% probability that a party will contact up to 4 parties per day on river	Objective not met: On 73% of sampled days, the groups had contacts with less than 4 parties. Of the 7 trips responding, 6 experienced a day or days where the objective contact limit was exceeded; this occurred 20 of the total 75 days.

Program Summary: Attraction Site Monitoring

Primary High Density Season

Management Objective	Results of Monitoring
100% probability of contacts with up to 150 people at LCR, Elves Chasm, Deer Creek and Havasu	LCR: Objective met: 82% of trips contacted less than 150 people at site. The other 18% experienced contact levels exceeding limits. This occurred 11% of sampling period. Elves Chasm: Objective met: 100% of trips contacted less than 150 people at site. Deer Creek: Objective met: 100% of trips contacted less than 150 people at site. Havasu: Objective met: 70% of trips contacted less than 150 people at site. The other 30% experienced contact levels exceeding limits. This occurred 43% of sampling period.

Program Summary: Attraction Site Monitoring (Continued)

Primary Shoulder Season

Management Objective	Results of Monitoring
65% probability of contacts with up to 70 people at LCR, Elves Chasm and Deer Creek;	LCR: Objective met: 74% of trips contacted less than 70 people at site. The other 26% experienced contact levels exceeding limits. This occurred 40% of sampling period. Elves Chasm: No Sampling. Deer Creek: Objective (roughly) met: 64% of trips contacted less than 70 people at site. The other 36% experienced contact levels exceeding limits. This occurred 29% of the sampling period.
90% probability of contacts with up to 100 people at Havasu	Havasu: Objective not met: 52% of trip sampled contacted less than 100 people at site. The other 48% experienced contact levels exceeding limits. This occurred during 80% of sampling period.

Recommendations

1. Management should continue to encourage the river concessioners to consider trip length, size and type when scheduling commercial river trips. Historically, concessioners have taken the lead in deciding launch schedules according to marketing needs, without consideration for the impacts on the natural and cultural resources of Grand Canyon National Park along the river corridor. It may be necessary for the NPS to further mandate conditions of scheduling commercial launches.

2. To assure that management objectives are being attained, it is necessary to reexamine those circumstances that contribute to the greatest probabilities of high contact levels at LCR, Deer Creek and Havasu. It may be necessary to step up voluntary compliance "no layover" stipulations for private river parties and denote attraction site stop durations. Establishing a ceiling on trip launches per week would also lessen probabilities of contacts at high density areas such as LCR, Deer Creek and Havasu.

3. In order to determine the affects of increased noncommercial launches on downstream congestion, a more specific monitoring program needs to be implemented. This may involve scheduling "double launches" in alternating weeks or years to closely examine the contribution of noncommercial trips to attraction site contacts and congestion. Additionally, management should consider a ceiling on <u>number of commercial launches</u> as opposed to <u>number of commercial passengers</u> per day for a trial period to compare results, and determine the ratio of commercial and noncommercial river and attraction site contacts.

4. We should continue to work towards obtaining a computerized simulation model. Data from the current monitoring programs may be used to ground truth a model for various launch scenarios.

5. We should reexamine the sociological environment of the Colorado River corridor. Considering the current trends and issues, it will be beneficial to update the previous sociological research on visitor perceptions and expectations. This will be necessary for future refinement of the carrying capacities established through the management objectives. The results of the research should be completed prior to the next review of the CRMP. The Colorado River Management Plan should include the means by which carrying capacities can be maintained.

6. The findings of this monitoring program should be considered when evaluating the recreational impacts on the natural and cultural resources along the river corridor. We should examine the relationship between visitation at attraction sites and the impacts on the resources including campsite and trail conditions, archeological sites, and wildlife, especially endangered species.

7. The River Contact Survey and Attraction Site Monitoring programs should be continued to further identify use patterns and changes in conditions due to modifications in policy regarding "Deadheads", and to substantiate previous findings of this program.

References

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APPENDIX

Appendix A: Trips Sampled, 1989 RIVER CONTACT SURVEY

Outfitter	Launch	Weekday	Length	Pax & Crew	Type
GRCD	5/08/89	Mon	12	21	Oar
ARIZ	5/30/89	Tue	6	34	Motor
AZRA	6/03/89	Sat	13	27	Oar
WRAD	6/06/89	Tue	7	26	Motor
ARIZ	6/13/89	Tue	6	32	Motor
Private	6/16/89	Fri	11	8	Oar
WRAD	6/16/89	Fri	9	34	Motor
SLEI	6/17/89	Sat	7	18	Motor
Private	6/18/89	Sun	14	10	Oar
OUTD	6/19/89	Mon	12	12	Oar
ADVW	6/21/89	Wed	5	35	Motor
DIAM	6/21/89	Wed	8	32	Motor
AZRA	6/27/89	Tue	13	28	Oar
WEST	6/28/89	Wed	6	40	Motor
HATC	6/29/89	Thu	6	13	Motor
SLEI	7/01/89	Sat	8	16	Motor
Private	7/03/89	Mon	18	15	Oar
GRCD	7/03/89	Mon	10	29	Oar
Private	7/04/89	Tue	18	16	Oar
Research	7/07/89	Fri	9	33	Motor
EXPD	7/11/89	Tue	11	20	Oar
Private	7/13/89	Thu	17	16	Oar
Private	7/14/89	Fri	16	12	Oar
TOUR	7/17/89	Mon	7	30	Motor
AZRA	7/17/89	Mon	13	28	Oar
Private	7/19/89	Wed	17	13	Oar
DIAM	7/24/89	Mon	10	11	Oar
Private	7/26/89	Wed	14	16	Motor
WEST	8/01/89	Tue	8	20	Motor
WEST	8/09/89	Wed	6	40	Motor
WEST	8/15/89	Tue	8	41	Motor
OARS	8/02/89	Wed	13	16	Oar
Private	8/03/89	Thu	19	16	Oar
WRAD	8/08/89	Tue	7	20	Motor
AZRA	8/22/89	Tue	13	28	Oar
Private	8/22/89	Tue	11	11	Motor
Private	8/24/89	Thu	12	2	Oar
Private	9/06/89	Wed	13	7	Oar
Private	9/16/89	Sat	18	15	Oar

Appendix B

RIVER CONTACT SURVEY

Name_____ Outfitter_____ Launch Date_____
Boats____Motor_____Oar____ #Crew_____ #Pax LFY-PHA_____ PHA-Take-out_____

Day of Trip	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Motor Trips Contacted																					
Oar Trips Contacted																					
Total # People Contacted																					
Camp																					

Attraction Site Stops (List)

Comments

INSTRUCTIONS:
Complete the top part as accurately as possible. Launch date, boat, crew and passenger numbers all provide critical information.
Definitions:

1. Day #: Day on the river, e.g. Day 2 is second day.
2. Trips contacted: Record motor and oar trips separately. Number of trips that you came within site of during the day EXCLUDING at attraction sites. These include river-river, river-shore, and shore-river contacts. You may encounter the same trip more than once any day. If you are in and out of sight of that trip for an extended period of time count it as one trip. However, if you pass a trip, get out of sight, then slow or stop and they pass you, this counts as two separate contacts. A "contact" is simply defined as seeing another trip as you pass them or they pass you. You don't have to make verbal or physical communication with a group to count it as a contact.
3. Total number of people contacted: Estimate within a range the total number of people contacted each day while travelling on the river. If you count the same trip as separate contacts as described above, the people should be counted each time also.
4. Camp: Record approximate river mile or note name of camp.
5. Attraction site stops: Any site along the river stopped at for sightseeing, hiking, etc.
6. Comments: Include adjustments you made because of congestion, (i.e. "20 boats at Havasu, didn't pull in", or "all Nanko camps taken, found camp at dusk", etc) whether you camped within sight or sound of another trip, or other appropriate information.

YOUR PARTICIPATION IN THIS MONITORING PROGRAM IS IMPORTANT. THANK YOU.

ATTRACTION SITE OBSERVATION FORM Name_____ Site:_____ Date:_____

tfitter or ivate Leader	# Boats Motor	Oar	# Pax	# Crew	Time Arrive	Time Leave	Time Spent	Type of Activities (Lunch, hike, swim,etc)	Comments (Incl Launch Date)

A. Topic	B. Management Objective:	C. Level of Change/Influence at which action is taken:	D. Means of Assuring Attainment of Mgt. Objective:	E. Consequences of Such Action:	F. Monitoring Program:	G. Objectives of Monitoring Program:	H. Desired Form of Results:	I. Evaluation of Results:	J. Relationship of Monitoring to Item C:
1. Temporal "Recreational Opportunity Spectrum":	1(a). Primary Season (high use period--6/1-8/15): This use period will be managed for higher density use. Density will be managed below those thresholds at which private and commercial boatmen reduce number of attraction sites visited to less than 10 to 14 sites, due to crowding and contacts. During this period of year, demand on the commercial sector is historically greatest (June is peak use month of the year). The commercial customer in most cases brings the least defined set of preferences. High density use will likely have the least impact on this group. The private boater who uses this period assumes higher density-related impacts, assuming they bring expectations for greater solitude.	1(a). High Density Use Period: i. Launch limits: 166 people/day; 1000 people/week. ii. # river contacts/day: 80% probability that a party will make contact with 7 or less parties per day, with up to one and one half hours in sight of less than 125 people. iii. # attraction site contacts/day: 80% probability of contacts with other groups at 70% of the sites; but the probability of meeting other groups at the Little Colorado River, Elves Chasm, Deer Ck. and Havasu Ck. increases to nearly 100%, with as many as 150 people. iv. # campsite contacts: 10% probability of camping within sight or sound of another group.	1(a). i. Voluntary Compliance with "no layovers" stipulations and suggested attraction site stop durations. ii. Establish ceiling on trip launches per week. iii. Equalize distribution of trip launches throughout the week. iv. Launch Schedules - computerized, with no two groups of the same trip length/itinerary leaving on the same day. v. Above with first day and mid-point designated checkpoints or campsites. vi. Above, with designated campsites for the entire river corridor. vii. Reduction of number of trips per week allowed.	1(a). i. Least restrictive/ most freedom to public/concession. Greatest likelihood of non-attainment of objective levels. ii. Leveling of use through period. iii. On-river freedoms preserved while some concessions lose preferred launch dates. iv. On-river freedoms; greater manipulation of concession launch schedules. v. Only two assigned camps but resultant rate of travel. vi. Highly restrictive/ regulated rates of travel. No choice in camp selection. Likelihood of limiting social contacts. vii. Limitation on the number of visitors or trips granted access, to assure attainment.	1(a). 1. Sociological Research Program. Results desired by December 1990. 2. Contacts/ crowding monitoring program: On-river (within and between parties); Destination sites; and, Campsites. Results desired prior to annual revision of Annual Operating Requirements.	1(a). 1. Monitor changes in experience preferences; perceptions of use levels. Monitor success at matching visitor with appropriate use period. 2. Indicate whether contact levels on the river (within and between parties), at destination sites and at campsites, are within objective ranges for all use periods. Attraction sites include: South Can., Redwall Cavern., Saddle Can., Nankoweap Ck., Little Col. River, Phantom Ranch, Lower Bass Camp/Shinumo Ck., Elves Chasm, Upper Elves Chasm, Tapeats Ck/ Thunder Riv., Deer Ck., Olo Can., Matkat. Can., Havasu Can., Silver Grotto, Blacktail Can., Fern Glen Can., National Can., and Nautiloid Can.	1(a). 1. Range/ distribution of compatible experience preferences and perceptions of users during all use periods. 2. Value (with confidence) for contact levels on river (within and between parties), at destination sites, and at camp, including a mean value for # of destination sites used for that use period.	1(a). 1. Subjective evaluation as to whether conflicts (resulting from contact) commonly exist between groups and population subsets for a given use period. 2. Sample means within +/- 10% of the mean, 80% confidence level.	1(a). 1. Planning action support. 2. Value outside satisfactory limits will initiate use of the next regulatory level for that use period.

A. Topic	B. Management Objective:	C. Level of Change/Influence at which action is taken:	D. Means of Assuring Attainment of Mgt. Objective:	E. Consequences of Such Action:	F. Monitoring Program:	G. Objectives of Monitoring Program:	H. Desired Form of Results:	I. Evaluation of Results:	J. Relationship of Monitoring to Item C:
1. Temporal "Recreational Opportunity Spectrum" (continued):	1(b). Primary Season (shoulder seasons--5/1-6/1 and 8/15-9/30): These use periods will be managed for medium density use; levels at which neither private nor commercial boaters make significant reduction in attraction sites visited. Optimum opportunity for up to 14 site visits over the trip. -During this period, demand of the commercial sector on the whole is less, affording the opportunity for private boaters and commercial passengers who wish to avoid highest use levels to do so.	1(b). Medium density use. i. launch limits: 166 people/day, up to 700 people in a week. ii. # river contacts/day: 80% probability of 4 or less on-river contacts/day, with a daily mean of approx. 40 minutes or less within site of less than 65 people. iii. # destination site contacts: 80% prob. that other groups will be encountered at 50% or less of the sites visited; but prob. at L.C., Elves Chasm, Deer Ck. increases to 65%, with as many as 70 people; at Havasu Ck.-90% prob, with 50-100 people. iv. campsite contacts: 10% or less probability of camping within sight or sound of other groups.	1(b). i. Voluntary Compliance with "no layovers" stipulation and suggested attraction site stop durations. ii. Establish ceiling on trip launches per week. iii. Equalize distribution of trip launches throughout the week. iv. Launch Schedules computerized, with no two groups of the same trip length/itinerary leaving on the same day. v. Above with first-day and mid-point designated checkpoints or campsites. vi. Above, with designated campsites for the entire river corridor. vii. Reduction of number of trips per week allowed.	1(b). i. Least restrictive/ most freedom to public/concessionaire. Greatest likelihood of non-attainment of objective levels. ii. Leveling of use through period. iii. On-river freedoms preserved while some concessions lose preferred launch dates. iv. On-river freedoms; greater manipulation of concession launch schedules. v. Only two assigned camps but resultant rate of travel effects. vi. Highly restrictive/ regulated rates of travel. No visitor choice in camp selection. Likelihood of limiting social contacts. vii. Limitation on the number of visitors or trips granted access, to assure attainment.	1(b). 1. Sociological Research Program. Results desired prior December 1990. 2. Contacts/ crowding monitoring program: On-river (within and between parties); Destination sites; and Campsites. Results desired prior to annual revision of Annual Operating Plans for commercial and private users (October 1 of each year).	1(b). 1. Monitor changes in experience preferences; perceptions of use levels. Monitor success at matching visitor with appropriate use period. 2. Indicate whether contact levels on the river (within and between parties), at destination sites and at campsites, are within objective ranges for all use periods.	1(b). 1. Range/ distribution of compatible experience preferences and perceptions of users duringall use periods. 2. Value (with confidence) for contact levels on river (within and between parties), at destination sites, and at camp, including a mean value for # of destination sites used for that use period.	1(b). 1. Subjective evaluation as to whether conflicts (resulting from contact) commonly exist between groups and population subsets for a given use period. 2. Sample means within +/- 10% of the mean, 80% confidence level.	1(b). 1. Planning action support. 2. Value outside satisfactory limits will initiate use of the next regulatory level for that use period.

A. Topic	B. Management Objective:	C. Level of Change/Influence at which action is taken:	D. Means of Assuring Attainment of Mgt. Objective:	E. Consequences of Such Action:	F. Monitoring Program:	G. Objectives of Monitoring Program:	H. Desired Form of Results:	I. Evaluation of Results:	J. Relationship of Monitoring to Item C:
1. Temporal "Recreational Opportunity Spectrum" (continued):	1(b). Primary Season (shoulder seasons--5/1-6/1 and 8/15-9/30): These use periods will be managed for medium density use; levels at which neither private nor commercial boaters make significant reduction in attraction sites visited. Optimum opportunity for up to 14 site visits over the trip. -During this period, demand of the commercial sector on the whole is less, affording the opportunity for private boaters and commercial passengers who wish to avoid highest use levels to do so.	1(b). Medium density use. i. launch limits: 166 people/day, up to 700 people in a week. ii. # river contacts/day: 80% probability of 4 or less on-river contacts/day, with a daily mean of approx. 40 minutes or less within site of less than 65 people. iii. # destination site contacts: 80% prob. that other groups will be encountered at 50% or less of the sites visited; but prob. at L.C., Elves Chasm, Deer Ck. increases to 65%, with as many as 70 people; at Havasu Ck.-90% prob, with 50-100 people. iv. campsite contacts: 10% or less probability of camping within sight or sound of other groups.	1(b). i. Voluntary Compliance with "no layovers" stipulation and suggested attraction site stop durations. ii. Establish ceiling on trip launches per week. iii. Equalize distribution of trip launches throughout the week. iv. Launch Schedules computerized, with no two groups of the same trip length/itinerary leaving on the same day. v. Above with first-day and mid-point designated checkpoints or campsites. vi. Above, with designated campsites for the entire river corridor. vii. Reduction of number of trips per week allowed.	1(b). i. Least restrictive/ most freedom to public/concessionaire. Greatest likelihood of non-attainment of objective levels. ii. Leveling of use through period. iii. On-river freedoms preserved while some concessions lose preferred launch dates. iv. On-river freedoms; greater manipulation of concession launch schedules. v. Only two assigned camps but resultant rate of travel effects. vi. Highly restrictive/ regulated rates of travel. No visitor choice in camp selection. Likelihood of limiting social contacts. vii. Limitation on the number of visitors or trips granted access, to assure attainment.	1(b). 1. Sociological Research Program. Results desired prior December 1990. 2. Contacts/ crowding monitoring program: On-river (within and between parties); Destination sites; and Campsites. Results desired prior to annual revision of Annual Operating Plans for commercial and private users (October 1 of each year).	1(b). 1. Monitor changes in experience preferences; perceptions of use levels. Monitor success at matching visitor with appropriate use period. 2. Indicate whether contact levels on the river (within and between parties), at destination sites and at campsites, are within objective ranges for all use periods.	1(b). 1. Range/ distribution of compatible experience preferences and perceptions of users duringall use periods. 2. Value (with confidence) for contact levels on river (within and between parties), at destination sites, and at camp, including a mean value for # of destination sites used for that use period.	1(b). 1. Subjective evaluation as to whether conflicts (resulting from contact) commonly exist between groups and population subsets for a given use period. 2. Sample means within +/- 10% of the mean, 80% confidence level.	1(b). 1. Planning action support. 2. Value outside satisfactory limits will initiate use of the next regulatory level for that use period.

GRAND CANYON RIVER CONTACT SURVEY

NAME_____ OUTFITTER_____ LAUNCH DATE_____ #Oar___ #Motor___ #Crew___ #Pax___

DAY OF TRIP	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
COMMERCIAL MOTOR #Different Parties																	
COMMERCIAL MOTOR #Actual Contacts																	
COMMERCIAL OAR #Different Parties																	
COMMERCIAL OAR #Actual Contacts																	
NONCOMMERCIAL #Different Parties																	
NONCOMMERCIAL #Actual Contacts																	
OTHER #Different Parties																	
OTHER #Actual Contacts																	
CAMP (List River Mile)																	
ATTRACTION SITE STOPS (LIST)																	

Comments: (Include any adjustments you made due to contacts)

INSTRUCTIONS:

1. Complete the top part as accurately as possible.
2. For each trip type: Commercial Motor, Commercial Oar, Noncommercial and Other (River Patrol and Research Trips), enter the number of **different parties** and **actual contacts** made each day.

   # Different Parties = Actual number of different river parties you saw each day. A river party is a single trip and may have one or several boats.

   # Actual Contacts = The number of times you came in contact with other river trips, even if it was the same river trip. You may encounter the same trip more than once a day. If you are in and out of sight of that trip for a period of time, count it as one contact. If you pass a trip, get out of sight, then slow or stop, and they pass you, count this contact separately. A **contact** is simply defined as seeing another trip as you pass them, or they pass you. This may be a river-river, river-shore, or shore-river contact.

3. **Camp:** record the river mile at which you camped.
4. List the **Attraction Sites** you stopped at and estimate number of people there if known.
5. **Comments:** Indicate if and where you shared at camp, if applicable. List any adjustments you made because of other trips or circumstances. This may include not stopping at a site because too many trips were there, or taking a different campsite because another trip took your planned camp. Include other information you think may be useful.

YOUR PARTICIPATION IN THIS MONITORING PROGRAM IS IMPORTANT. THANK YOU.

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